Indian Journal of Public Health Research & Development
An International Journal

SCOPUS IJPHRD CITATION SCORE
Indian Journal of Public Health Research and Development
Scopus coverage years: from 2010 to 2018. Publisher: R.K. Sharma, Institute of Medico-Legal Publications
ISSN: 0976-0245E-ISSN: 0976-5506 Subject area: Medicine: Public Health, Environmental and Occupational Health
CiteScore 2017-0.03
SJR 2017 - 0.108
SNIP 2017- 0.047

Website: www.ijphrd.com
Indian Journal of Public Health Research & Development

CONTENTS

Volume 10, Number 2  February 2019

1. Comparative Evaluation of Different Tooth Taper and Its Influence on Retention of Metal Crowns Luted with Resin Cements”-An In Vitro Study ................................................................. 01
   Pankaj Kulkarni, Veena Hegde, Lokendra Gupta

2. The Effect of Kitchen Table Exercise Program on Strength, Balance and Functional Mobility in Elderly Population ....................................................................................................................... 06
   Kiran K Kamble, Smita B Kanase, Khushboo Bathia

3. Is Dietary Management is Essential for Gallbladder Diseases? A Review based on Available Literature .................................................................................................................. 11
   Sahil George Lal, K. Chithra, Nageshwar V

4. Community Satisfaction Index as an Evaluation of Health Services Quality ................................. 14
   Panjumi Khorida, Imas Sayyidati Hadidah, Nyoman Anita Damayanti

5. Examining Preconception Care Related to Knowledge among Reproductive Age Women: A Narrative Review .................................................................................................................. 19
   Nidhi Rao, M Hemalatha, Nageshwar V

6. Impact of Parental Stress on Body Mass Index of Children .................................................... 24
   Aditya Pareek, Uma Joshi

7. Utilisation of Janani Suraksha Yojana among Women in Urban and Rural Areas of Western Uttar Pradesh .................................................................................................................. 30
   Shalki Mattas, Bhawana Pant, Saurabh Sharma, Arvind Shukla

8. Comparison of Microleakage in Repairing Furcal Perforations in Biodentine with Cyanoacrylate and Biodenine Alone: an Invitro Study ................................................................. 36
   Aditya Shetty, Anuj Varshney, Lakshmi Nidhi Rao, Mithra N Hegde, Tony Mathew, Chitharanjan Shetty

9. Mental Health among High and Higher Secondary School Students ..................................... 41
   Nangaiyarkarasi S

10. Gender Gap in Literate Life Expectancy –A District-Wise Study in India ................................. 45
    Barnali Thakuria
11. Evaluation of a Community Orientation Program for First Year Medical Undergraduate Students ..... 50
   Suvetha Kanappan, Subhashini Ganesan, Sivan YS, Darshan Manoj

12. An Economic Analysis of Small Scale Industries in Pudukkottai District (Tamil Nadu) ............... 57
   S Sureshand, S Jasirani

13. Role of Microfinance and Women Empowerment in Madurai District, Tamil Nadu ..................... 62
   S Thangamayan, S Suresh, B Chithirairajan

14. Knowledge and Attitude Regarding Menstrual Blood Banking ................................................. 68
   Jomon C U, Laveena Anitha Barboza, Linu Sara George

15. Nutritional and Sensory Evaluation of Moringa Oleifera Cookies ........................................... 74
   K Manivel

16. Occupational Health Hazards among IT Sector Women Employees in Tamil Nadu .................. 80
   B Chithirai Rajan, M Prabhakar Christopher David

17. Gender Preference and Awareness of PCPNDT Act among Rural Reproductive Age Group Women . 85
   Rock Britto, M Srinivetha, G Sathvik, T Subashri, S Elango

18. Breast Feeding Literacy and Belief - A Community based Cross Sectional Study among Reproductive Age Group Women in Tamil Nadu ................................................................. 91
   Neethu George, Meera George, Rock Britto D, Vinodhini, Varshitha Kutcher, Yogesh, S Elango

19. A Study on Implementation of Powdered Cottonseed and Oil on Bread ................................ 97
   K Manivel

20. Phacoemulsification in Patients with Fuchs Heterochromic Iridocyclitis .................................... 103
    Mukesh Singh Rajpoot, Pritee Chouhan, Rahul Bhargava, Anuj Chauhan, Shiv K Sharma

    A Manjula, Prasannababy, S J Nalini, R Ramya

22. A Review of Epidemiology of Unintentional Injuries among Children in India ....................... 114
    Alex Joseph, Dhasarathi Kumar, King David Edward

    Amanpreet Kaur, Jagdeep Singh, Harpreet Kaur, Harpreet Kaur, Priyanka Devgun

24. On the Structure of Infant Mortality using Accelerated Failure Time (AFT) Model: A Comparative Study based on National Family Health Survey (NFHS) Data in India ........................................ 124
    Anu Sirohi, Piyush Kant Rai

25. Retinal Degeneration Using Iris Image through Machine Learning ........................................... 133
    D Nagarajan, R Sujatha, J Kavikumar, Chang Phang, M. Lathamaheswari

26. To Study the Frequency of Cystic and Solid Lesions among Solitary Thyroid Nodules .......... 138
    Dinesh Kumar Singh, Anju Singh, Paras Kharbanda
27. Prevalence of Pregnancy Associated Listeriosis in and around Puducherry, India ............................ 143
   Balamuruganvelu Singaravelu, Sreenivasalu Reddy V, Geethavani Babu, S Kamala Kannan

28. Dengue Cases Treated in Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar in Year 2016 ............................................................ 148
   Harpreet Kaur, S L Mahajan

29. Mediating Effect of Social Support on Stress among Parents of Children with Intellectual Disability ................................................................. 153
   Deepak Pandey, Pushkar Dubey

30. Risk of HIV Infection among Tuberculosis Patients of Jaintia Tribes, Meghalaya ............................... 159
   Arpita Mitra, Roumi Deb

   S.Sudha

32. Evaluation of Levels of Gunas in Indian Athletes Using Prakriti Concept ........................................ 168
   Tarun Jain, Ritu Sharma, Abha Singh, Karuna Mehta

33. Effect of 8 Weeks Body-Weight Resistance Training on High-Normal Blood Pressure and Stage 1 Hypertension Subjects- Pilot Study to Validate the Protocol ......................................................... 175
   Sonu Punia, Sivachidambaram Kulandativelan

34. Management of Patient with Metabolic Encephalopathy – A Case Study ....................................... 181
   Ranjana Chavan, Manisha Vikrant Mistry

35. Multiple Massive Maxillary Exostoses – A Case Report with Complete Denture Rehabilitation ...... 186
   Ramesh Kumaresan, Balamanikasrinivasan C, Priyadarshini Karthikeyan, Vini Rajeev

36. A Hybrid Ensemble Classification Approach to Determine the Impact of Asthma in Association with Gastro Esophageal Reflux Symptoms ................................................................. 191
   K.Kasturi, S.Prasanna

37. Prevalence of Dysmenorrhea among Female Medical Students and its Impact on their Day to Day Activities ................................................................. 197
   Preetha Paul, Arul Sekary, Kannan I

38. Factors Enhancing Academic Performance in Management Courses among Post Graduate Pupils’ of a Management Institution ................................................................. 203
   M. Sankar, Sudha

39. Antibiotic Susceptibility Pattern of *Staphylococcus aureus* and Methicillin – Resistant *Staphylococcus aureus* Isolated from Various Clinical Specimens in a Tertiary Care Teaching Hospital, Pondicherry ................................................................. 208
   P.Vamsi Muni Krishna, V.Sreenivasulu Reddy, V.Praveen Kumar, P.Suresh
40. Effect of Retrowalking, a Non-Pharmacological Treatment on Pain, Disability, Balance and Gait in Knee Osteoarthritis: A Randomized Controlled Trial ................................................................. 214  
Shabnam Joshi, Shailendra Kumar Singh, Jaspreet Singh Vij

41. To Live or to Leave? – The Ethical Factors Influencing the Parsi Community’s Health ............... 220  
Shraddha Dhal

42. A Review on Plasma Glucose: Preventing Mongering of Madhumeha ........................................... 224  
Basavaraj S Hadapad, Anupama V. Nayak, Rajesh Kamath

43. Introduction of a Universal EMR Integrated Online Healthcare Management System Mobile App in Hospitals Throughout India and its Benefits to Patients, Hospitals and Governments .................... 228  
Basil Jacob, Rajesh Kamath

44. Antibiotic Susceptibility Profile of Methicillin Resistant *Staphylococcus Aureus* - A Cross-Sectional Study ................................................................. 234  
Kavitha E, Srikumar R

45. The Multiple Ways of Constructing the Overmind ............................................................................ 240  
Rajarethinam Emmanuel, S.N. Sugumar, S. Chandrchud, Chithirai Rajan, M. Ramesh, Telu Suvarna

46. Are Soft Drinks Soft on Teeth? A Study on Dental Erosion Caused by Soft Drinks Marketed in India ................................................................. 245  
Prajna P. Nayak, Nishu Singla, K.V. V. Prasad, Nandita S Rao

47. Decentralized Internet of Things ....................................................................................................... 251  
Jafar A. Alzubi, J Selvakumar, Omar. A. Alzubi, R Manikandan

48. Self Reported Oral Pain and Dysfunctions Associated with Radiation Induced Oral Mucositis among Head and Neck Cancer Patients - A Prospective Observational Study ................................................................. 255  
Prabha Lis Thomas, Harmee Kaur, Karthik S. Rishi

49. A Comparative Evaluation of Antibiotic Susceptibility Pattern of Methicillin Sensitive and Methicillin Resistant *Staphylococcus Aureus* Isolated from Clinical Specimens in a Tertiary Care Hospital ... 262  
P.Vamsi Muni Krishna, V.Sreenivasulu Reddy, V.Praveen Kumar, P.Suresh

50. Efficient Approaches for Prediction of Brain Tumor using Machine Learning Techniques ............... 267  
Jafar A. Alzubi, Ambeshwar Kumar, Omar. A. Alzubi, R. Manikandan

51. Association between Socio-Demographic Variables and Alcohol Dependency among Alcoholics attending Alcohol Deaddiction Camp Held at Gundlupet, Karnataka, India ...................................................... 273  
M.C. Smitha, M. P. Somashekar, Nagendra
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>Prescription Pattern of Antibiotics for Upper Respiratory Tract Infection in Shah Alam,</td>
<td>Kavitha Ashok Kumar, Mohammad Rafiq Bin Baderu Khisam, Ashok Kumar Jeppu</td>
</tr>
<tr>
<td></td>
<td>Malaysia</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Re-Standardization Makassar Healthy City based on Local Needs</td>
<td>Sukri Palutturi, Muhammad Alwy Arifin, Nurhayani</td>
</tr>
<tr>
<td>54</td>
<td>The Effect of Progressive Muscle Relaxation in Reducing Fatigue among Nurses in Mental</td>
<td>Rosinta Uli, Robiana Modjo</td>
</tr>
<tr>
<td></td>
<td>Hospital</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>Situational Analysis of Career Choices among Indonesian Nurses Returnees</td>
<td>Ferry Efendi, Nursalam Nursalam, Elida Ulfiana, Rista Fauziningtyas</td>
</tr>
<tr>
<td>56</td>
<td>The Development of the Vestibular Stability in Children Who are Engaged in Football Taking</td>
<td>Georgy G Polevoy</td>
</tr>
<tr>
<td></td>
<td>into Account their Nervous System</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>Analysis of Factors affecting Malnutrition among Elderly in Panti Werdha Mojopahit</td>
<td>Arif Wicaksono; Muhammad Sajidin; Heri Tri Wibowo</td>
</tr>
<tr>
<td></td>
<td>Mojokerto</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>Patterns of Mortality Caused by Natural Disasters and Human Development Level: A South</td>
<td>Masum Billah, Pedro Arcos González, Rafael Castro Delgado</td>
</tr>
<tr>
<td></td>
<td>Asian Analysis</td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>Isolation and Identification of the Fungi Associated with Mosquitos and Utilizing their</td>
<td>Maysaa Taqi Al-Khazali, Sarah Kadhim Al- Rahimy, Aseel Kariem Alsultany,</td>
</tr>
<tr>
<td></td>
<td>Filtrates in the Biocontrol of <em>Culex molestus</em> Forskal</td>
<td>Hawraa Hasan Atiyah</td>
</tr>
<tr>
<td>60</td>
<td>Clinical and Molecular Profile of Patients with Breast Cancer in Tikrit Province</td>
<td>Ali Abbas Ali</td>
</tr>
<tr>
<td>61</td>
<td>Evaluation of “Sublay” and “Onlay” Mesh Hernioplasty Techniques of Ventral Hernial Repair</td>
<td>Ali Hussein Al-Tai</td>
</tr>
<tr>
<td>62</td>
<td>Estimated Analysis on Environmental Health Risk of 2.5 Micron Particulate Matter to Urban</td>
<td>Alvia Hamastia, Ema Hermawati, Rina Marina, Ridcho Andrian</td>
</tr>
<tr>
<td></td>
<td>Communities in South Jakarta</td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>Effects of Multimicronutrient and IFA Supplementation in Preconception Period against</td>
<td>Lucy Widasari, Maisuri T' Chalid, Nurhaedar Jafar Abdul Razak Thaha</td>
</tr>
<tr>
<td></td>
<td>Birth Length and Birth Weight: A Randomized, Double Blind Controlled Trial in Banggai</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regency, Central Sulawesi</td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>The Effect of PM$_{2.5}$ Exposure on Workers’ Enzymatic Superoxide Dismutase (SOD)</td>
<td>Aulia Fitriani, Umar Fahmi Achmadi, Budi Hartono Bambang Wispriyono,</td>
</tr>
<tr>
<td></td>
<td>Concentration at a Ready-Mix Concrete Factory in 2018</td>
<td>Doni Hikmat Ramdhan</td>
</tr>
</tbody>
</table>
65. Association between PM$_{2.5}$ and Oxidative Stress Using Malondialdehyde Biomarker among Workers in a Concrete Batching Plant in 2018 .......................... 351
   Emad Fiki Munaya, Umar Fahmi Achmadi, Budi Hartono, I Made Djaja, Doni Hikmat Ramdhan

66. Teachers as Promoters of Sex Education among Adolescents with Mental Retardation ........... 357
   Hestilia Nurul Ma’rifah, Evi Martha

67. Improper Use of Inhaler Technique in the Control of Asthma in Adult .................................. 363
   Mustafa Neama, Hawa Khalid Alwan

68. Ecological Studies of Certain Aphid Species and their Associated Predators on Wheat Plants at Qadisiyah Distract, Iraq ................................................................. 370
   Ahmed Shamkhi Jabbar, Saadoon Murad Sasdoon

69. Influence Bacterial Inoculant of Local Isolates of Azotobacter Vinelandii and Irrigation Water Quality on Growth and Yield of Wheat (*Triticum aestivum* L.) ............................................. 376
   Ghanem Bahlool Nooni, Abdualla Kreem Jbar, Sophia Jabbar Jasim Al-Rikabi

70. Effect of Zinc Methionine on Some of the Productive Traits of Broilers .................................. 381
   Abbas S.H. Al Machi, Jassim K. Al-Gharawi, Mousa A. Hassan Radhi A. Al-Ziadi

71. Topical Combination of Nifedipine with Lidocaine for Anal Fissure Treatment ......................... 387
   Rasha Kadim Albayati, Adel Musa Al-Rekabi, Nahedh R. Alammar, Hayder Adnan Fawzi

72. Relationship between Diabetes Mellitus and Tuberculosis in Indonesia ................................... 392
   Indriya Wardhani, Mondastri Korib Sudaryo

73. A Cross-sectional Study: Analysis Risk Factors against Pulmonary TB AFB Positive in Indonesia ..................................................................................................................... 398
   Ira Aminah Padang, Mondastri Korib Sudaryo

74. The Achievement of Ministry of Health Polytechnic Semarang as an Excellent Service University Upon Implementing a Decade of Internal Quality Assurance System ........................................ 404
   Lanny Sunarjo, Enik Sulistyowati, Triana Sri Hardjanti, Supriyadi

75. Snakehead Fish (*Chana striata*) Powder Formulation for Increasing Calorie and Protein Intake in Malnourished Children ................................................................. 409
   Magdalena, Mahpolah, Ismi Rajiani

76. Spatial Analysis of Hypertension Risk Factors Incidence in South Kalimantan Province ............. 414
   Suroto, Mahdalena, Ismi Rajiani

77. Health Improvement after Childbirth with Traditional Snack Consumption .............................. 418
   Serilaila, Betty Yosephin Simanjuntak, Lela Hartini, Mahpolah

78. Evaluation of Apelin, Periostin and Tartrate-resistant Acid Phosphatase-5B in Ankylosing Spondylitis Male Patients According to their Disease Activity ........................................... 423
   Israa Abdelmalik Salem, Adnan F. Al-Najar, Abbas Toma Joda
79. Sleep Disturbances and Self-Management among Adolescents with Nocturnal Asthma in Al-Najaf City

Doaa Ghaleb Hadi Al-Abayechi, Fatima Wanas Khudair, Arafat Hussain AL-Dujaili

429

80. Factors Associated with the Occurrence of Anemia in Pregnant Women in the Work Area of Baraka Public Health Center, Enrekang District, South Sulawesi Indonesia

Kalma

434

81. Effect of Minimum Inhibitory Concentration and Minimum Bactericidal Concentration of Honey Bee Trigona spp on Streptococcus pyogenes

Ratih Dewi Dwiyanti, Yulia Tri Andini, Leka Lutpiatina

439

82. Study of Humeral Immune Response and Some of the Blood Variables in Mice Balb/c Treated with LPS of Klebsiella pneumoniae Antigen and Glycyrrhiza glabra Extract

Mohammed A Hamad, Najeeb Mohammed Hussein Omar I. Aljumaili

445

83. Comparison of CT, MRI, and Diffusion–Weight MRI in Differentiation Cystic Brain Tumors (Prospective Study)

Hassan Falah Al-Khafaji, Kassim A. H. Taj-Aldean

456

84. Health Literacy as a Risk Predictor of Cardiovascular Diseases among Informal Sector Worker in Makassar City

Novita Medyati, Ridwan Amiruddin, Arsunan, A.A, Muhammad Syafar, Saifuddin Sirajuddin, Risnah

462

85. Evaluation and Strategic Planning of Playground for Kids to Reduce the Accident Risk (Case Study in Immanuel Kindergarten Batu City)

Qomariyatus Sholihah, Sylvie Indah Kartika Sari, Vania Putri Pramuditha, Aprizal Satria Hanafi

467

86. Correlation Tuberculosis Drugs Treatment Phase with SGPT/Bilirubin Total Level and Correlation both of the Enzymes from TB Patients

Anny Thuraidah, Jihan Rahmah Naily, Nadiya Uswatun Hasanah, Leka Lutpiatina

473

87. An Environmental Health Risk Assessment of Workers’ Ambient Exposure to Particulate Matter of 2.5 Microns or Less at a Concrete Batching Plant

Katania Rosela Putri, Umar Fahmi Achmadi, Ririn Arminsih, Doni Hikmat Ramdhan

479

88. RAPD Identification of Bacteria Isolated from Arm Third Degree Burn Wound

Hanan Sami Nouri

485

89. The Impact of Social Media in Improving Patient’s Mental Image Towards Healthcare Provided by Private Hospitals’ in Amman/Jordan

Mahmood Al-Samydai, Ali Al-kholaifeh, Ali Al-Samydai

491

90. Sequencing of the Exon 17 C/T, Intron 3 and Intron 8 in INSR (Insulin Receptor Gene) to Identification New SNPs in Iraqi Women with Polycystic Ovarian Syndrome (PCOS)

Noor H. Mohammad, Abdul Kareem A. AL-Kazaz

497
92. Factors Influencing Woman Behavior to Visit Dental Clinic to Improve their Smile ................................................. 504
   Rudaina Othman Yousif, Mahmood Jasim Al-samydai

93. CD4+ Cell Impacts of Orally Red Fruit (*Pandanus conoideus*) Oil Extract in HIV Patients with Antiretroviral Therapy ................................................................................................................................. 510
   Titus Tambaip, Marni Br Karo, Rosdiana Natzir, Maria Bintang, Andi Asadul Islam, Wa Ode Salma, Mochammad Hatta

94. Effect of Iron Overload on Some Physiological and Biochemical Variables in Immature Female Rats ......................................................................................................................................... 515
   Wasan S. Sarhan, Raouf M. Fadhil, Alyaa S. Jawad

95. Assessment of Learning Disabilities among Deaf Adolescent .......................................................... 520
   Wameedh Hamid Shaker

96. Evaluation of Drug Management Information System to Improve Quality and Users Satisfaction: Case Study at a Primary Health Center ......................................................................................................................................... 525
   Rico Kurniawan, Popy Yuniar, Tris Eryando, Kenji Fadlin Azimi, Retnowati, Devi Maryori

97. Analysis of Risk Factors for Changing Conversion of Pulmonary Tuberculosis AFB Positive Patients in the Intensive Phase, Makassar City, Indonesia ................................................................................................................................ 531
   Umni Kalsum Supardi, Mondastri Korib Sudaryo, Ida Leida. M. Thaha

98. Therapy Role of Camel Milk to the Treatment for Hepatitis Mice Which Induces via Listeria Monocytogenes .................................................................................................................................. 537
   Shereen Hussein Ameen, Azeez Khalid Hameed

99. Physical Activity: Mine Workers’ Behavior Related With Metabolic Syndrome ............................... 543
   Dwi Okta Rizkiani, Robiana Modjo

100. Correlation Analysis of Sleep Duration, Dietary Habits, Physical Activity and Knowledge with Blood Pressure on Engineering Workers, Procurement, and Construction (EPC) ................................................................. 549
    Wardatul Hamro, Robiana Modjo

101. Phenotypic and Molecular Study of *mecA* Gene in MRSA Isolated from Clinical Cases in Misan Province /Iraq ................................................................................................................................. 553
    Zahid S. Aziz, Marwa A. Hassan

102. A Solution for Nosocomial Infection in Healthcare Facilities ............................................................ 559
    Yasaman Parsia, Puteri Fadzline Mohamad Tamyez

103. Quality of Life Determination among Hemophiliac Children ............................................................ 564
    Wameedh Hamid Shaker, Mohmmed Baqer Hassan, Ibrahim Alwan Kadhim Al-Ashour

104. Sensitivity and Specificity of Linear Gingival Erythema as Immune Suppression Marker in Pediatric HIV-infected at UPIPI Soetomo General Hospital Surabaya, Indonesia ......................................................... 572
    Mario Powa Mensana, Alexander Patera Nugraha, Diah Savitri Ernawati, Bagus Soebadi, Erwin Asta Tryono, Dominicus Husada, Remita Adya Prasetyo
105. Maternal Mortality with Panel Regression Approach Model based on Maternal and Child Health Revolution Program or ETC Performance Indicators at Nusa Tenggara Timur Province Indonesia ................................................................. Yuanita Clara Rogaleli, Irfan, Kuntoro


107. The Susceptibility of Aedes Aegypti to Cypermethrin Used in Vector Control Programs of Dengue Hemorrhagic Fever .......................................................... Asep Tata Gunawan, Arif Widyanto, Hari Rudijanto IW, Sugeng Abdullah, Wibowo Ady Sapta, Ahmad Fikri, Ismi Rajiani

108. Effectiveness of Hand Hygiene Training by Kirkpatrick Model ........................................ Widayanti

109. Quantitative Risk Assessment of Crystalline Silica Exposure in Ceramics Industry ............ Moch. Sahri, Abdul Rohim Tualeka, Noeroel Widajati

110. Central Obesity as a Risk Factor for Hypertension in Women : in Bogor District ................ Melly Kristanti, Helda

111. Health Promoting Lifestyle and its Associated Factors among Private University Students in Shah Alam, Selangor ................................................................................................. Wan Nurul Fatini Syazwanie Wan Mohd Nazri, Hasanain Faisal Ghazi, Maged Elnajeh

112. Why Don’t Couples Use the Contraceptive That’s Best for Them? Social Determinants of Long Acting and Permanent Contraceptive Method Use in Indonesia ............................................ Rita Damayanti, Hoirun Nisa, Iwan Ariawan, Christiana Titaley, Dini Dachlia, Yunita Wahyuningrum, Douglas Storey
113. Correlation of Protein Tyrosine Kinase with Thyroid Hormones in Type 2 Diabetes Mellitus Patients and those with Diabetic Nephropathy Iraqi Patients ................................................................. 623
   Zainab Mahdi Abed Al-Khdhairi, Bushra H. Ali

114. The Effects of Titanium Dioxide Nanoparticles on Salivary LDH Activity; Kinetic Study ........ 629
   Eaman A Al-Rubaee, Zainab A Salman, Nagham Q Ragheb

115. Lipid Profile in Leukemia and Non-Hodgkin Lymphoma Patients ............................................ 634
   Jinan Hameed Abu-Shana, Ekhlass M.Taha, Alaa Fadhil Alwan

   Ehsan F. Hussein, Ahmed H. Merdas

117. Rebound Increase in Bilirubin Level with its Risk Factors after Treatment by Intensive Phototherapy for Neonatal Hyperbilirubinemia ........................................................................................................ 646
   Zainab W Al-Maaroof, Wisam Abbas, Abdulkareem Shatti Al-Jamil

118. Association between Lipoprotein Lipase Polymorphism and the Myocardial Infarction in Patients with Diabetes Mellitus Type 2 ........................................................................................................ 653
   Farah A. Ashour, Moaed E. Al-Gazally, Monem M.Alshok

119. Clinical Evaluation of 0.2% Hyaluronic Acid and its Effect on the Level of Interleukine-1B in Gingival Crevicular Fluid Before and After Treatment of Plaque Induced Gingivitis ........... 659
   Ahmed K. Hussien Al-Shabeeb A.N., Mohammed B.D.S

120. A Statistical Study of the Recurrence Rates of Cancers in Different Groups ......................... 665
   Sarah Salih Hasan, Wisam Jasim abed ali, Hasanain Ali Shubbar

121. Impact of Drinking Reverse Osmosis Water (RO Water) on Human bone Density in AL-Najaf City .............................................................................................................................. 669
   Fulath Abdul-Redah Muhsin

122. Oral Health Care Utilization of Internally Displaced Migrants Residing in Al-Najaf City 675
   Azal Hadi Al-Masoody, Monadle R. Hadi

123. Post-Traumatic Stress Disorder among Mosul and Nineveh Medical Group Colleges Students: A Survey Study ................................................................. 680
   Omaima Abdul Razzaq Zubair, Mohammad Yousif Mohammad

124. The Histopathological Effects of Silver Nanoparticles on the Liver During Gestational Stages ................................................................................................................. 686
   Najat F. Mohammed Salih, Gazwa D. Al-Nakeeb
125. Comparative Effect of Topical Tacrolimus and Topical Isotretinoin in Patients with Oral Lichen Planus .......................... 693
   Karar abdulzahra Mahdi

126. Association between Vitamin D Level and Polycystic Ovarian Syndrome in Premenopausal Iraqi Women ................................................................. 698
   Rafal Mustafa Murshid, Alaa Abdulgader Abdulrazaq, Eeman Marouf Muhammed

127. Hypertension and Vitamin D Deficiency ................................................................. 704

128. The Role of Chlamydial Infection in Male Infertility ............................................. 710
   Jabbar S. Hassan, Reyam F. Salah, Ayad M. Gaidan

129. Hypertension and Vitamin D Deficiency ................................................................. 704

130. Protective Effect of Green Tea Against Poisoning with Malathion in Adult Rats ................................................................. 716
   Saba Ibrahim Salih, Kareem Kdaer Karem, Hutham Abd Ali Abd Alhussain, Alaa Adil Al-hindawi

131. Burdens on Caregivers of Children with Down Syndrome in Middle Euphrates Region of Iraq .......................... 721
   Esraa Shaker Al-Bahadli, Murtadha Ghanim Adai

132. The Role of Chlamydial Infection in Male Infertility ............................................. 710
   Jabbar S. Hassan, Reyam F. Salah, Ayad M. Gaidan

133. Protective Effect of Green Tea Against Poisoning with Malathion in Adult Rats ................................................................. 716
   Saba Ibrahim Salih, Kareem Kdaer Karem, Hutham Abd Ali Abd Alhussain, Alaa Adil Al-hindawi

134. A Biological Study on Some Causes of Dental Caries and Methods of Treatment and Prevention ................................................................. 727
   Hamed Ibrahim Mohammed, Hassanein jwad abid al Hussein

135. Immunohistochemical Expression of CD26 in Bone Marrow Biopsies of Chronic Lymphocytic Leukemia Patients ................................................................. 731
   Taymaa Moayed Ahmed, Abeer Anwar Ahmed

136. MicroRNAs 301a and 93 Biomarkers for Endometrial Cancer ................................................................. 740
   Basim Shehab Ahmed, Hussain Abady Aljebori Israa Mehdi Al-sudani

137. Serum levels of Anti-Mullerian Hormone, Leptin, T3, T4 and TSH in Women with Polycystic Ovary Syndrome in Iraq ................................................................. 745
   Ibtisam Kareem Mohaisen

138. HLA-G and P-Selectin Gene Polymorphism in Women with Recurrent Abortion Having Antiphospholipid Syndrome ................................................................. 752
   Shahad Fadhil Hashim, Israa Adnan Ibraheem, Oruba Qutuff Al-Bermani

139. Oral Hygiene and Periodontal Treatment in Children with Coeliac Disease: A Case-Control Study ................................................................. 757
   Wissam Hamid Al-Janabi, Mukhlaed Luay Al-Fallouji, Ali Falah Hassan

140. Immunoassay Study for Detection of Hepatitis C Virus among Blood Donors in Diwaniyah Governorate, Iraq ................................................................. 763
   Abdulameer K. Leelo

141. The Effect of Hypercytokinemia in the Pathogenesis of Polycystic Ovary Syndrome in Iraqi Women ................................................................. 768
   Safa Sailh Mahdu Al-Shattawi, Essam Fadel Al-Jumili

142. Effects of Cefotaxime on Histopathological Changes in Rabbit Model of Infected Fractured Ulna ................................................................. 773
   Ali H. Saliem
154. A Comparative Study between Homocysteine, s-adenosylhomocysteine and Troponin for Myocardiac Infarction Patients and the Role of Vitamin B6 and B12 in the Homocysteine Accumulation

Mohammed Hachim Albadri, Abed Alkareem, Lamees Majed

155. Blood Pressure and Heart Rate monitoring for 40 Hours in a Sample of Iraqi adult Hypertensive Patients: a Cross Sectional Study

Wisam Hatef Kareem Al-Muramdy

156. Detection of Antibodies for Goat Brucellosis in Some Reigns of Diyala Province

Osamah Nassir Wali, Ahmed Hanash Al-Zuhairi, Raad Mahmoud Hussein, Afaf Abdullah

157. Determination of Immunological Markers associated with Celiac Disease in Basrah province

Sufyan Abdul Rahman Abd Ali Al-Hilfi, Wafaas Sh. Shani

158. Multi Drug Resistant and Biofilm Formation of Staphylococci Isolated from Patient with Diabetic Foot Infection in Basrah Province

Rabee A. Al-Jaleel Ibrahim, Zainab R Abdul-Hussein

159. Pathogenic Microorganism’s Detection in tap Water in Basra city treated within Ultraviolet radiation

Mahmoud S. Al-Mounas, Wathiq A. Al-Ramdhan, Rasha N. Jawad, Ekhlass B. Zubairy

160. Radiographical Findings in Patients with Temporomandibular Joint Clicking Compared with Control Group by Cone Beam Computed Tomography (CBCT)

Haider Mahde Idan, Fawaz D. Al-Aswad

161. Soft Generalized Vague Sets: An application in Medical Diagnosis

Audia Sabri Abd Al Razzaq, Luay Abd Al Hani Al Swidi

162. Study the Effect of Some Hormones on Type of Labor

Rafeda M. AL-Amiri, Hanaa S.Khadum, Awatif H. Issa

163. The Role of Lewis Blood Type Molecules in Atopic Dermatitis

Khedhir Hassan Ali, Fatima Rammadan Abdul, Hanan Tariq Subhi

164. Breastfeeding and Its Effect on Fetal Health from the First Hour of a Baby’s Life

Amean A. Yasir

165. Detection of Human Papilloma Virus DNA among Patients with Gynecological and Breast Cancer

Ifad K. AL-Shibly, Bushra J. Alrubaaee, Mays Hadi Jebur

166. Efficacy of Health Belief Model in Enhancing Exercise Behavior to Preventing Stroke among Geriatrics Homes Residents in Baghdad City

Mohmed Q. Baktash, Arkan B. Naji
167. Evaluation of Nurses’ Knowledge toward Abortion in Bint Al-Huda Teaching Hospital
   Alaa M. Tuama, Wasan Raheem Mubarak, Ahmed Abudallh Abud

168. Evaluation of Nurses’ Knowledge toward Breast Self-Examination at Al- Hussien Teaching Hospital in
   Thi-Qar Governorate
   Alaa M. Tuama, Wasan Raheem Mubarak, Ahmed Abudallh Abud

169. Knowledge of Patients with Coronary Heart Disease about Secondary Prevention Measures
   Hassan Abdullah Athbi, Huda Baker Hassan

170. Post-Traumatic Stress Disorders among Cancer Patients in Kirkuk City
   Abbas Lateef Muhe-Aldeen, Jenan Akbar Shakor, Darya Yaseen Mustafa

171. Knowledge of Patients with Coronary Heart Disease about Secondary Prevention Measures
   Hassan Abdullah Athbi, Huda Baker Hassan

172. Role of Language, Healing Power of Words and Communication Skills in Improvement of Healthcare
   Quality and Healing Outcomes
   Rafid Hadi Hameed

173. Assessment of Neonatal Screening Program over 5 Years in Karbala Governorate
   Fatimah Mohammed Taj-Aldeen, Ali Abdulridha Kadhim Abyuteen, Mohammed Firas K. Al-Abadi, Abbas Faddil Alkhafaji

174. Assessment of Patient’s Knowledge about Cardiac Catheterization
   Haider Jassim Hamid

175. Effectiveness of an Education Program on Knowledge of Caregivers about Psychosocial Problems for
   Clients with Epilepsy
   Saja M. Hashem, Haider A. Jabor

176. Effectiveness of an Educational Program in the Development of Scientific Thinking among Undergraduate
   Students in General Teaching Methods
   Mushriq Mohammed Mojawal, Shaimaa Hassan Abdul Hadi

177. Effectiveness of Structured Teaching Program upon Midwives’ Knowledge Concerning Progress of Labor
   in Al-Hilla Hospitals
   Fawziya M. Nattah, Amean A. Al-Yasir, Muna A. Khaleel

178. Prevalence of Burnout among physicians in a Kerbala, Iraq
   Mohammed Abdulhussein Abdulzahra Almhana, Ali Abdulridha Kadhim Abyuteen, Amer Fadhil Al Haidary

179. Serum level assessment of serum level of Neopterin (NP) and Anti-Cyclic Citrullinated Peptide (ACCPA)
   Antibody as markers of disease severity in rheumatoid arthritis
   Mortadh Mohammed Husein, Ali Mansoor

180. The Need for Discharge Plan for Patients with Coronary Artery Diseases in Critical Care Units
   Shatha Saadi Mohammad, Sahar Adhem Ali
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>181</td>
<td>Automated Retinal Imaging System for Detecting Cardiac Abnormalities Using Cup to Disc Ratio</td>
<td>S. Palanivel Rajan, L. Kavitha</td>
</tr>
<tr>
<td>182</td>
<td>Effect of KIDNET, Karma Yoga Teaching and Nostalgic Street Games on the Self Knowledge of Orphan Girls</td>
<td>Neelam Sharma, Mahak</td>
</tr>
<tr>
<td>183</td>
<td>Automatic Retinal Lesions Detection of Diabetic Retinopathy Using Curvelet Based Enhancement</td>
<td>Banuselvasaraswathy B, Arul Murugan C, Karthigaikumar P</td>
</tr>
<tr>
<td>184</td>
<td>Human Health Monitoring System over Internet in Wireless Body Area Networks</td>
<td>B. Ramya, S. Jagadeesan</td>
</tr>
<tr>
<td>185</td>
<td>A Comparative Study of Body Mass Indices and Waist-Hip Ratios of Women in Relation to their Menstrual Status</td>
<td>Harmanpreet Kaur, Gurpreet Kaur, Surinder Kumar</td>
</tr>
<tr>
<td>186</td>
<td>Segmentation and Vein Extraction in Sclera for Human Identification</td>
<td>Dhamodaran M, Tharani T</td>
</tr>
<tr>
<td>187</td>
<td>Royal Jelly and Honey Ameliorates Cisplatin Induced Alterations in Biomarker Levels of Oxidative Stress in Kidney of Rat</td>
<td>Waykar Bhalchandra, Yahya Ali Alqadhi</td>
</tr>
<tr>
<td>188</td>
<td>Relationship of the Selected Kinematic Variables with Movement Phases of Two Different Types of Jerk of Weightlifting</td>
<td>Sunil Kumar, Kiran</td>
</tr>
<tr>
<td>189</td>
<td>Detection of Brain Tumor with Cellular Automata and Convolutional Neural Networks</td>
<td>Murugan A, Harsha R</td>
</tr>
<tr>
<td>190</td>
<td>A Survey on Brain Tumor Segmentation Techniques</td>
<td>K. Sambath Kumar, A. Rajendran</td>
</tr>
<tr>
<td>191</td>
<td>Hand Talk-An Assistive Technology for Deaf and Dumb</td>
<td>T. Ranganathan, P. Hephzibah, M. Jagadeesh, R. Jegadees, S. Kanimozhi</td>
</tr>
<tr>
<td>192</td>
<td>Identification of Influential Indices of Heart Diseases Using Support Vector Machine</td>
<td>Angel Latha Mary S., Uma Maheswari K.</td>
</tr>
<tr>
<td>193</td>
<td>FPGA based Abnormality Classification in Kidney Ultrasound Images using KNN</td>
<td>B. Vijayakumari, S. Rashmita</td>
</tr>
<tr>
<td>194</td>
<td>Image Segmentation Techniques Implemented in Medical Images-A Research Review</td>
<td>Jagadeesh K., A. Rajendran</td>
</tr>
</tbody>
</table>
195. Detection of Brain Tumor using Back Propagation Algorithm through MRI ................................. 1097
   A. Sridevi, T. Sabitha

196. Smart Asthma Prediction System using Internet of Things .......................................................... 1103
   M. Sivaram Krishnan, S. Sri Ragavi, M. Siva RamKumar, D. Kavitha

197. Smart Indoor and Outdoor Guiding System for Blind People using Android and IOT .................. 1108
   S. Nivishna, C. Vivek
Comparative Evaluation of Different Tooth Taper and Its Influence on Retention of Metal Crowns Luted with Resin Cements - An In Vitro Study

Pankaj Kulkarni¹, Veena Hegde², Lokendra Gupta³
¹Former Post graduate Student, ²Professor, ³Associate Professor, Department of Prosthodontics, Manipal College of Dental Sciences, Manipal Academy of Higher Education MANIPAL

ABSTRACT

Background: Taper of the prepared tooth is one of the most important factor for retention while luting cements are weak but a critical link for retention

Aims: Compare the influence of different tapers of prepared teeth on retention of metal crowns when luted with two commercially available adhesive resin cements

Materials and Method: 48 extracted human premolars were used in this study. Each tooth was mounted in a PVC ring with auto polymerizing acrylic resin. A customized device was used to standardize the tooth preparation. Teeth were divided into 3 equal groups representing taper 6º, 12º, and 30 º. Metal crowns were fabricated for each tooth. Prepared teeth were luted with either RelyX Ultimate Clicker or Multilink Automix. Specimens were subjected to ‘Crown Pull Off’ test using Universal Testing Machine

Statistical analysis used: One way ANOVA with Tukey post-hoc and Independent ‘t’ test

Results: Statistically significant difference was found in the mean failure stress at 6º degree taper angle compared to 30º with p value ≥ 0.003 for both the adhesive resin cements. There was no significant difference of mean of failure stress for metal crowns luted with RelyX Ultimate Clicker and Multilink Automix

Conclusions: Mean failure stress was highest at taper at 6º with a steady decrease at 12º and significant decrease at 30º taper. It is utmost important for clinician to prepare the tooth within the range of 12º taper. While adhesive resin cements RelyX Ultimate and Multilink Automix are equally effective in terms of retention of the crowns

Key-words: Crown retention, Failure stress, Luting agent, Resin cements.

INTRODUCTION

Tooth preparation is an art and requires lot of skill and planning and is governed by biological, mechanical and esthetic principles. A prepared tooth should receive a crown in such a manner that it should restore the function in harmony with adjacent soft and hard tissues.

Retention is one of the most important mechanical principle of tooth preparation. It is the quality of prepared tooth that prevents the restoration from being dislodged by forces acting parallel to the path of placement.¹

Taper is defined as the convergence of the two opposing external walls of a tooth preparation viewed in a given plane. Recommended taper is 6 degrees.² Although in practice various studies have shown dentists to produce taper angles ranged between 12.2 to 27 degrees.²

Corresponding author:
Veena Hegde
Professor, Department of Prosthodontics
Manipal College of Dental Sciences, Manipal Academy of Higher Education MANIPAL
Email: veena.hegde@manipal.edu
On the other hand luting cement is a weak but a critical link for retention of an indirect restoration. Function of luting cement is to 1) fill the space between the crown and the prepared tooth; 2) provide retention resisting dislodgement; and 3) provide good aesthetical conditions for the indirect restoration.\textsuperscript{3-5}

Luting cements consists of two types\textsuperscript{6}

1. Conventional water based luting cements
2. Anhydrous or polymerizing cements

Polymerizing cements are usually composite resins in conjugation with adhesive or self-adhesive systems. Self-adhesive systems are now been popular due to ease in manipulation but show less bond strength than cements with additional adhesive systems. On the other hand method of curing also plays important role. Self-cured cements shows less bond strength than light cured cements.\textsuperscript{7} This is especially true for metal crowns where light curing is not an option due to the opacity of the metal. Adhesive resin cement retention can be enhanced by using a bonding agent in such cases. The adhesive properties consists of both, the bond to the prepared tooth as well as bond to the indirect material that covers the tooth.

Present study determines the effect of tapers 6\textdegree, 12\textdegree and 30\textdegree on metal crowns luted with two commercially available cements adhesive resin cements Multilink Automix (Ivoclar Vivadent) and Rely X Ultimate Clicker (3M ESPE). It also compares retentive ability of two adhesive resin cements.

**MATERIALS AND METHOD**

**Specimen preparation**

48 freshly extracted human premolar teeth were collected. Roots of each tooth were notched with grooves for added retention. Autopolymerizing acrylic resin was mixed in thin consistency and poured in PVC ring of 2.5 inch height and 1 inch diameter. Each tooth was embedded in acrylic resin in the PVC ring by centering it in the ring and covering the root until 2 mm apical from cement enamel junction. (Fig 1) PVC ring was held firmly on a surveyor base with a cast holder and complete crown preparations were done using a high speed hand piece which was stabilized by a specially fabricated customized holding device (Fig 1) that can be moved around a rotational axis to obtain the desired degree of taper for the preparation.

![Figure 1. Mounting of extracted premolar with acrylic in PVC Ring](image1)

![Figure 2. Tooth preparation with customized device](image2)
Straight diamond points with a rounded tip were used to prepare axial surfaces and to establish a chamfer finish line. With the hand piece rigidly secured, the axial surface was prepared by rotating the surveyor base against the diamond point. (Fig 2) Occlusal surface of the teeth were made flat, parallel to the floor and Occlusocervical dimension (h) of the teeth were standardized at 3 mm for all the specimens according to study done by Sekar et al.\textsuperscript{8} The crown preparation with different tapers 6, 12, 30 degrees respectively were achieved by tilting then hand piece to their respective degree. (Fig 2) Angulation of each specimen was verified by using tool room microscope.

The prepared tooth was considered as truncated cone for surface area calculations. Zidan et al.\textsuperscript{9} used a mathematical formula for calculation of surface area.

\[ D = \text{diameter of the base of conical frustum} \]
\[ d = \text{diameter of the apex of conical frustum} \]
\[ h = \text{axial height} \]
\[ A_1 = \text{the conical surface of the frustum of a right cone} \]
\[ A_2 = \text{Surface area of top of frustum} \]
\[ \text{The surface area } A = A_1 + A_2 \]

\[ A_1 = \pi \left( r_1 + r_2 \right) \left[ h \left( 2r_1 - r_2 \right) \right] \frac{1}{2} \text{ where } r_1 = D/2, r_2 = d/2, \text{ and } A_2 \text{ the surface area of the top of frustum was calculated according to the following equation: } A_2 = \pi (r_2)^2. \]

Impressions of all the specimens were made with 2 step technique with polyvinyl siloxane putty and light body (Flexceed).

All the impressions were poured in type IV stone or die stone (Pearlstone). Wax patterns were made in form of uniform copings with type 2 inlay wax (Starwax), with loop on the occlusal surface to facilitate crown pull off test. Copings were then invested with phosphate bonded investment material (Bellasun). Casting was done using nickel chromium metal pellets (Wiron 99) in a centrifugal casting machine (Bego). 48 Specimens were divided into 24 (6, 12, 30 degrees) each for cementation with either Multilink Automix or RelyX Ultimate Clicker. All the specimens were then kept in water for 7 days before testing. On 8th day the samples were subjected to testing. Samples were connected to universal testing machine with the help of U shape orthodontic wire passing through the loop of the cemented crowns. Crowns were subjected to pull off test with a crosshead speed of 1mm/min

The force of removal was noted and was recorded in newtons. The force was then converted from newtons into failure stress as Megapascal (MPa) by the following formula

\[ \text{Failure stress (Megapascal)} = \frac{\text{Force (Newton)}}{\text{Surface area of prepared tooth in sq.mm}} \]

The data obtained was subjected for statistical analysis.

**RESULTS**

Statistical analysis was executed using IBM SPSS statistics 20. A parametric test; One-way ANOVA presenting the mean values of force of retention with standard deviations of RelyX Ultimate Clicker resin cement and Multilink Automix resin cement on the three different tapers is provided in Table 1 and Table 2 respectively.

<table>
<thead>
<tr>
<th>Taper angles</th>
<th>6°</th>
<th>12°</th>
<th>30°</th>
<th>*p-value</th>
<th>Post hoc test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force(Mpa)</td>
<td>5.42 ± 0.98</td>
<td>4.76 ± 0.76</td>
<td>3.97 ± 0.81</td>
<td>0.016</td>
<td>6° &gt; 30°</td>
</tr>
</tbody>
</table>

*One way ANOVA with post hoc Tukey’s test

There was a significant difference between the force of removal for Relyx Ultimate at 6 and 30 degree taper.

<table>
<thead>
<tr>
<th>Taper angles</th>
<th>6°</th>
<th>12°</th>
<th>30°</th>
<th>*p-value</th>
<th>Post hoc test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force(Mpa)</td>
<td>5.23 ± 0.69</td>
<td>4.44 ± 0.82</td>
<td>3.75 ± 0.72</td>
<td>0.003</td>
<td>6° &gt; 30°</td>
</tr>
</tbody>
</table>

*One way ANOVA with post hoc Tukey’s test
There was a significant difference between the force of removal for Multilink Automix at 6 and 30 degree taper group IIA and IIC.

The mean values with standard deviations of the retentive properties of both the cements were obtained using Independent ‘t’ test, provided in Table 3.

Table 3. Comparison of retentive properties of different resin cements

<table>
<thead>
<tr>
<th>Angle</th>
<th>RelyX Ultimate</th>
<th>Multilink</th>
<th>p – value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>6°</td>
<td>5.42±0.98</td>
<td>5.23±0.69</td>
<td>0.65*</td>
</tr>
<tr>
<td>12°</td>
<td>4.76±0.92</td>
<td>4.44±0.82</td>
<td>0.47*</td>
</tr>
</tbody>
</table>

The influence of three different tapers; 6°, 12°, and 30° on the mean forces of removal of the metal crowns from the prepared teeth when tested individually with two cements, displayed statistically significant differences (p<0.05). Within the three different convergent angles, post hoc Tukey test was carried out, the results demonstrated greater degree of force of removal with 6° convergent angles when compared to 30° convergent angle.

However, the two adhesive resin cements; RelyX Ultimate Clicker resin and Multilink Automix when compared and evaluated for the retentive properties did not show any statistically significant differences. (p>0.05)

**DISCUSSION**

The present investigation was conducted to determine the effect of the taper of the tooth 6°, 12° and 30° on retention of metal crowns when luted by the resin cements. Two commercially available adhesive resin cements RelyX Ultimate Clicker and Multilink Automix were chosen. The failure stress was assessed by the use of crown pull off test. The other method to assess the adhesive properties of cements include tests for bond strength, tensile strength, and micro-tensile strength. Bond strength test is reliable test and easy to conduct but is criticized as it does not simulate clinical situation. Crown pull of test simulates the clinical condition better than other tests. Various studies have been published where crown pull off test was used.

The influence of taper angle on retention of metal crowns using resin cements was noted in the present study. The study showed that mean retentive failure stress on metal crowns luted with Relyx Ultimate and Multilink Automix showed statistically significant decrease when taper angle of prepared tooth was 6 degrees compared to taper angle of 30 degrees. But mean retentive crown pull off failure stress on metal crowns showed no statistically significant difference at 12 degree taper when compared to either 6 degree taper or 30 degree taper. Rosensteil et al ¹ described and various studies explained that when the taper is less it limits the path of withdrawal. While as taper increases free movement of restoration increases and results in decreased retention. Studies by Jogrenson ¹⁰, Kaufman et al ¹¹, Dodge WW et al ¹², Hovijitra et al ¹³ had reported these results earlier. Wilson et al ¹⁴ recommended taper of 6 as ideal taper, however some studies reveal that many dentists show tendency to overtaper the tooth preparation especially in posterior teeth with limited access. The present study therefore took in account taper angle as high as 30°

Zidan et al ⁹ reported that increase in taper angle from 6 degrees to 24 degrees decreased the mean failure stress value by 20 percent for resin cements and 40 percent for the glass ionomer cement. Omar mowafy et al ¹⁵ found out significantly higher failure stress at 12 degree convergence angle compared to at 35 degrees. In contrary to the present study Osman et al 2010 et al ¹⁶ found no statistically significant difference in failure stress values for metal crowns luted with Panavia Resin Cements for taper angle as low as 12 degrees and as high as 120 degrees.

In similar study Zidan et al ⁹ did not find significant difference between two adhesive resin cements (C&B Metabond and Panavia) at different taper angles (6, 12, 24). Ernst et al ¹⁷ compared different commercial adhesive resin systems and found no significant difference in retentive properties between them.

Present study also compared the influence of adhesive resin cements on failure stress. There was no statistically significant difference when the mean of value of failure stress for Multilink Automix and RelyX ultimate clicker at all the taper (6, 12, 30) were compared. (Table 3).

In similar study Zidan et al ⁹ did not find significant difference between two adhesive resin cements (C&B Metabond and Panavia) at different taper angles (6, 12, 24). Ernst et al ¹⁷ compared different commercial adhesive resin systems and found no significant difference in retentive properties between them.

Even though RelyX ultimate showed better results than Multilink automix there was not much of difference
between retentive qualities of the two cements. As oral conditions are difficult to simulate in the laboratory, the results obtained should be interpreted with caution and clinical validation. Also in this study metal castings were used which limited the use of light curing option, therefore retentive properties of these cements may vary when used in all ceramic crowns.

**CONCLUSION**

Within the limitation of the study it can be concluded that angle of convergence for the tooth preparation should be as minimal as possible (6 degree), but angle until 12 degrees is acceptable for good retention. Whereas when the taper angle increases as high as 30 degrees the retention is affected even with the use of adhesive resin cements.

RelyX Ultimate Clicker and Multilink Automix are equally effective as luting agents for cementation of metal crowns.

**Ethical Clearance:** Permission taken from the institutional research committee. Animal or human subjects are not involved in the study.

**Source of Funding**—Self

**Conflict of Interest** - Nil

**REFERENCES**


The Effect of Kitchen Table Exercise Program on Strength, Balance and Functional Mobility in Elderly Population

Kiran K Kamble1, 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

Background: The elderly population is the population of 60 years old and above and they are considered as a targeted population. This targeted population is more prone for risk of falls due to strength and balance dysfunction. So this study is conducted to improve this dysfunction with Kitchen table exercise program.

Objective: To find the effect of Kitchen Table Exercise Program on strength, balance and functional mobility in elderly population.

Materials and Method: 60 Subjects with 60 years of age and above included in the study. Subjects were divided into the two groups 30 in each group. Group A received the Kitchen table exercise program and Group B received conventional exercises. Both groups received 12 weeks of exercise program. In pre interventional assessment strength was taken by 1 RM; Balance was taken by Berg Balance scale and Functional mobility by Elderly mobility scale. Post interventional assessment was taken by the same outcome measures after 6th and 12th weeks of intervention.

Result: Both the groups showed improvement in the strength, balance and functional mobility. But the group A is improved in comparison with group B (P<0.0001)

Conclusion: The kitchen table exercise program can improve strength, balance and functional mobility in elder population.

Keywords: Kitchen Table Exercise Program, Strength, Balance, Functional mobility, elderly population.

INTRODUCTION

India has acquired label of an ageing nation with 7.7% of its population being more than 60 years old. The population of 60 years old and over are considered as elder people.1-2 As the age advances the risk of fall increases3-4. Around 25%- 35% of older population are prone to fall i.e., one or more falls every year4-7. Strength of muscle decreases as the age advances and in older individual’s activities become much harder (lifting a bag of groceries) or may not be able to perform activity without assistance. Impairment of muscle strength leads to falls (impairment in balance) and functional inability 8. The muscle mass decrease by 50% between the age group of 20-90 years. This results in decline in strength which correlates with increased risk of fall9. Factors contributing to loss of balance are intrinsic and extrinsic factors. Intrinsic factor includes change in muscular strength10,11. Important parameter of balance performance includes range of motion, muscle strength, somatosensory function and the size and the quality of the base of support.12-14 Rehabilitation of balance can work on static or dynamic balance. Dynamic balance is the ability to maintain balance while body is in motion and it keeps the centre of gravity over the base of support15.
Mobility is nothing but the physical ability to move. The first signs of decreasing mobility are mostly observed for more demanding mobility tasks, such as walking longer distances. Environmental barriers and reduction in physical activities shows increased in level of mobility decline. Environmental barriers directly relates with fear of falling and moving outside which produces avoidance of outside activities.

Regular exercise has been shown to improve and maintain muscle strength and to improve mobility and balance in elderly individuals. The rehabilitation of this targeted population should include a simple and understandable exercise program.

The current study is conducted with the same objectives to solve the above age related problems and make the older individuals independent in their functional activities. The kitchen table exercise program is designed to address the components of strength, balance and functional abilities. The Kitchen table exercise program is the simple exercise program.

But the effectiveness of this exercise program is still not studied in older population. So this study is conducted with an aim to find the effectiveness of KTE program on targeted population of community.

**MATERIALS AND METHODOLOGY AND PROCEDURE**

The study was conducted at Krishna Institute of Medical Sciences, Physiotherapy OPD, Karad. The Ethical clearance was taken from Institutional Ethical committee prior to the start of treatment. The subjects were taken as per the inclusion and exclusion criteria. The inclusion criteria was both male and female of 60 years of age and above having Berg balance scale score less than 45 and who were willing to participate was taken. Subjects with cardiac diseases, who have undergone recent surgeries and traumatic conditions, were excluded. An informed consent was taken from the subjects selected for the study.

The random sample of 60 subjects was studied in this experimental study. These subjects were divided into 2 groups with simple random sampling method. Group A was experimental group with the mean age of 69.86±6.42 years while the group B was an control group with a mean age of 71.9±6.68. Group A had a Kitchen table exercise program i.e., Sit to stand, Plantarflexion and Dorsiflexion, Weight bearing exercises, Standing with feet apart, Weight shifting exercises and Clock exercises. Group B was a control group. They were given conventional treatment of free exercises, Reach out exercises, Balance board exercises, Walking and Resisted exercises.

The pre treatment and post treatment assessment was done by outcome measures like 1 RM, Berg Balance Scale and Elderly mobility Scale.

Data analysis - The statistical analysis of 1 RM, Berg Balance Scale and Elderly mobility Scale was done by repeated measure anova test.

1) 1 Repetition Maximum:

**Table 1: Comparison of pre and post 1 RM score within the group**

<table>
<thead>
<tr>
<th></th>
<th>PRE</th>
<th>POST 6th Week</th>
<th>POST 12th Week</th>
<th>P VALUE</th>
<th>F VALUE</th>
<th>INFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP A</td>
<td>28.73±4.54</td>
<td>32.6±4.64</td>
<td>36.66±4.69</td>
<td>&lt;0.0001</td>
<td>1011.7</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>GROUP B</td>
<td>29.3±3.33</td>
<td>30.6±3.28</td>
<td>32.13±3.17</td>
<td>&lt;0.0001</td>
<td>119.8</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

In the Group A, the P value by repeated measure anova test was found to be <0.0001 which was extremely significant. In Group B, the P value by repeated measure anova test found to be <0.0001 which was extremely significant.
2) BERG BALANCE SCALE:

Table No.2: Comparison of pre and post Berg balance score within the group

<table>
<thead>
<tr>
<th></th>
<th>PRE 6TH WEEK</th>
<th>POST 12TH WEEK</th>
<th>P VALUE</th>
<th>F VALUE</th>
<th>INFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP A</td>
<td>41.36±1.77</td>
<td>50.13±1.87</td>
<td>&lt;0.0001</td>
<td>654.38</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>GROUP B</td>
<td>41.7±2.20</td>
<td>45.2±2.09</td>
<td>&lt;0.0001</td>
<td>296.85</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

In the Group A, The P value by repeated measure anova test was found to be <0.0001 which was extremely significant. In Group B, the P value by repeated measure anova test was found to be <0.0001 and which was extremely significant.

3) ELDERLY MOBILITY SCALE

Table No. 3: Comparison of Pre and Post ELDERLY MOBILITY SCALE score within the group

<table>
<thead>
<tr>
<th></th>
<th>PRE INTERVENTION 6TH WEEK</th>
<th>POST INTERVENTION 12TH WEEK</th>
<th>P VALUE</th>
<th>F VALUE</th>
<th>INFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP A</td>
<td>10.56±1.16</td>
<td>17.03±0.92</td>
<td>P &lt;0.0001</td>
<td>1046.8</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>GROUP B</td>
<td>10.23±0.89</td>
<td>13.2±1.09</td>
<td>P &lt; 0.0001</td>
<td>338.49</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

In Group A, the P value by repeated measure anova test was found to be <0.0001 which was extremely significant. In Group B, the P value by repeated measure anova test found to be <0.0001 which is extremely significant.

RESULT

The Kitchen table exercise program i.e., Group A showed extremely significant improvement than the Group B which was controlled group.

DISCUSSION

This study was conducted in the elderly population of 60 years of age and above to determine the effect of kitchen table exercise program on strength, balance and function mobility. In this study, 60 subjects had participated who were screened as per the inclusion and exclusion criteria and analysed as per the pre test outcome measures out of which 35 were male subjects and 25 were female subjects. The mean age of subjects included in Group A was 69.86 and in Group B was 71.9 out of 60 subjects, this was statistically not significant. Subjects were analysed and were divided into two groups according to random sampling method. 30 subjects were included in Group A and were received Kitchen table exercise program. The treatment protocol was continued for 12 weeks. Similarly, 30 subjects were included in Group B and were received conventional exercises for strength, balance and functional mobility and the treatment protocol was continued for 12 weeks.

Pre and post treatment outcome measures for strength, balance and functional mobility was done with 1 Repetition maximum, Berg balance scale and elderly mobility scale. The specific treatment protocol was followed for 12 weeks.

Kitchen Table Exercise program is designed to be a self directed exercise program. The program consists of six levels and each level contains six exercises. The exercises are specifically designed to address components of strength, balance and functional mobility. The purpose of present study was to find out effect of Kitchen Table Exercise program on strength, balance and functional mobility in elderly people. These exercise program consists of various closed kinematic chain exercises, weight bearing exercises.
According to various studies it was analysed that closed kinematic exercises may help in improving quality of life of elder population. This study aims to improve quality of life of eldersubjects. In this study treatment protocol was given for twelve weeks. As this program consists of six levels each level of exercises were given for two weeks.

Intra group comparison (within group) was analysed by repeated measure anova test for 1 Repetition Maximun, Berg Balance Scale and Elderly mobility Scale. This showed that there was extremely significant difference of Group A 1 RM score with (P<0.0001). Berg Balanve Scale scores was also extremely significant with (P<0.0001). Elderly Mobility Scale score shows extremely significant difference with (P<0.0001 ).

Similarly, In Group B, there was extremely significant difference of 1 RM with (P<0.0001) respectively. Berg Balance Scale score was also extremely significant with (P<0.0001). Elderly Mobility Scale score was also extremely significant with (P<0.0001).

In this study, an attempt was made to improve strength, balance and functional mobility. Improvement of subject on 12th week i.e. after the treatment program gets over.

The subject could perform exercise without support.

There could be improvement in balance in subject.

There was reduction in symptoms in both the groups but the reduction of symptoms was more in group A then group B.

The muscle strength increases consistently through gradual resistance exercises.\(^{19,20}\) The body reacts to new positions based on the changes in the base of support.\(^{12,13}\) Hence, various exercises such as open chain and closed kinematic exercises are used to improve balance.\(^{21,22,23}\) Regular resistance exercise improve muscle function. Increases strength after damage and it prevents decline in muscle strength despite aging.\(^{24,25}\)

In conclusion, the result of current study shows that Kitchen table exercise program is more significant than routine exercise program for strength, balance and functional mobility in elderly people. Further studies can be done for longer duration of treatment protocol in order to determine the long term effect of this program.

**CONCLUSION**

Different approaches are used for improvement of the strength, balance and functional mobility in elderly people but this study concluded that the Kitchen Table Exercise program was more effective than the conventional routine exercises in improvement of the strength, balance and functional mobility and improving quality of life.

Hence, It is proved that Kitchen Table Exercise Program has significant effect in elderly population.

**Ethical Clearance:** Ethical clearance was taken from institutional ethical committee of KIMSDU, Karad

**Source of Funding:** Project is funded by KIMSDU, Karad

**Conflict of Interest:** No any conflict of interest

**REFERENCES**

2.  Provisional Guidelines on Standard International Age Classification; Department of International Economical And Social Affairs; Series M No.74; United Nations, New York, 1982.
18. Keogh JWL, Morrid S, Barrett R. strength and co ordinationtraining are both effective in reducing the postural tremor amplitude of older adults. J Aging Phys Act, in press.
Is Dietary Management is Essential for Gallbladder Diseases?  
A Review based on Available Literature

Sahil George Lal¹, K. Chithra², Nageshwar V³

¹M.Sc. Nursing 2nd Year Student, ²Associate Professor, ³Assistant Professor,
Teerthanker Mahaveer College of Nursing, TMU, Moradabad, U.P

ABSTRACT

BACKGROUND: In biliary system, Gall bladder diseases (GBD) are the most common disorder, and most of the cases are asymptomatic. It is also one of the most common diseases affecting 10-15 % of Caucasian adults (racial group having light-colored skin; white) in developed countries have GBD.

OBJECTIVE: To explore the evidence on patients’ knowledge on common gallbladder diseases, as well as their practice regarding dietary management of GBD.

METHOD: Pub Med and EBSCO were searched for reviews on knowledge and practice regarding dietary management among patients affected with GBD.

RESULTS: The accessible literature refines to get 7 qualitative studies. In this narrative review, 6 research studies supported that dietary management is helpful in gallbladder diseases and may provide proper health, if it is followed. 1 research study shows that there is no remarkable result of low-fat diet in the prevention of gastrointestinal symptoms and specially gallstones.

CONCLUSION: Gallbladder diseases can not only be treated with medicines, but it actually requires dietary management so that it can be treated with diet.

KEYWORDS: knowledge, practice, dietary management, patients, gallbladder diseases.

INTRODUCTION

A gallbladder disease is one of the highest common gastrointestinal disorders, which result from a complex synergy of genetic and environmental factors. At present, it assumed as a big cause of abdominal morbidity, which greatly increase hospital admissions in the developing countries. In developed population of North India, its degree is 7.4%, where as in cadavers, it was only 6.3%. In some studies, the incidence of GBD in the Iranian men and women is quite low between the age group of 31-40 years. It increases sharply in men older than 60 years and women older than 50 years to more than tenfold (12.5 and 24.6% in males and females 71-80 years respectively).

NEED FOR THE STUDY

GBD is a common medical condition, one among which is Cholelithiasis (formation of stone in the gallbladder), Cholecystitis (infection and inflammation of gallbladder) and Choledocholithiasis (formation of stone in the common bile duct). Regarding diet as an vital environmental agent, mounting cue in nutritional epidemiology commends that pattern assay is the most realistic approach to assess the associations between overall diet and health or disease. Stinton and Shaffer, (2012), in their study showed that up to 80 % of cases are asymptomatic. Amaral and Thompson, (1985); Erlinger, state that diet is the most common risk factors for gallbladder disease specially high intake of energy leads to obesity where as high fat will increase the risk for GBD.

Gall bladder diseases are genuine and their vogue increases greatly with age; it is also decided by gender, body weight, and race. Gall bladder disease does not account serious notes such as colic and jaundice. Generally, gall bladder diseases are extensively cured by
cholecystectomy, and most of the cases are executed by laparoscopy.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1116086/

AIM OF THE STUDY

To identify the knowledge of the patients affected with gallbladder disease regarding the dietary management.

OBJECTIVE: To explore the evidence on patients’ knowledge on common gallbladder diseases, as well as their practice regarding dietary management of GBD.

METHODOLOGY

Search strategy methods-

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

The database search was PubMed and EBSCO.

Types of Studies- Cohort study, Case-control study, Phenomenological approach, Prospective analytical single center study, Randomized clinical trial, Descriptive study.

Types of Participants- Patients suffering from GBD.

Settings- Government and private hospitals.

For this narrative review, articles were searched on Pub Med and EBSCO, using keywords such as knowledge, practice, dietary management, patients, and gallbladder diseases. During initial search 13447 titles were retrieved and number of records screened after duplication were 12660 and rest 787 records were excluded. 35 records screened and records excluded were 12625, full text articles assessed for eligibility were 14. Full text articles excluded due to irrelevant content and subscription were 21 and finally 7 studies included in qualitative synthesis.

Outcome: The outcomes from these studies clearly focus to the understanding about the knowledge and practice of gallbladder disease patients regarding their dietary management and up to which extent it is essential. Knowledge and practice of dietary management plays an important role in gallbladder disease patients.

DISCUSSION

According to Gonzalez et.al, 2014, the finding showed that abdominal adiposity, insulin resistance, obesity and nutritional factors such as higher intake of total energy, fats, sugar and long fasting periods are the cause of gallstone formation while satisfactory fiber intake in diet is a protective factor.¹

According to Menezes et.al, 2013, it was observed that there was permanence, appearance or disappearance of symptoms postoperatively.²

As per the study of Kim E and Lee Y, 2012, it shows that there is a little association that dietary habits are related with cholesterol gallstone formation.³

According to Johansson et.al, 2014, the study suggested that Gall stones can be treated in the primary care, at home which are less serious for the patient as well as cheap for the society.⁴

As per the study conducted by Jyi Tsai et.al, 2014, the results suggested that high intake of vegetable protein can decrease the complication of cholecystectomy in women.⁵

According to Bansal A et.al, 2014, 43.56 years is the average of the clients with the ratio of 0.52:1 for male and female respectively In this study, fused type of regime, and multiple gallbladder calculi was observed.⁶

According to Jessri and Rashidkhani, 2015, dietary pattern system gives data related to the disease and dietary.⁷

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:

Out of 7 articles, 6 research studies supported that dietary management is helpful in gallbladder diseases and may provide proper health if it follow in appropriate manner.

Importance in Education:

Education is an important part for every individual not only to learn the facts about different aspects but
also to apply the facts in our life and more over that to follow them in daily routine in order to get a better life. Like the same way this review suggests that having a good dietary knowledge as well as practice during the gallbladder diseases is an essential part to follow in order to maintain a healthy lifestyle. Appropriate knowledge leads to better health which comes only with the education.

**Future Significance:**

It’s always easier to prevent a problem rather than treat it, and this is especially true when it comes to the gallbladder problems.

**Limitations:**

- Computerized data bases were limited.
- Limited to only in pregnant women.

**Strength:**

- Article search was carried out on a significant problem
- Review could find out the gap in knowledge and practice on dietary management of patients affected with gallbladder diseases.

**Weakness:**

- Articles mainly focus on only knowledge and practice regarding dietary management.
- Only 7 qualitative articles were included for data synthesis due to limitations.

**CONCLUSION**

A healthy regime deals with a converse coalition with gallbladder disease. As a result, these data need to be acknowledged in future prospective studies for etiological purposes in both men and women to draw more deciding events. High intake of vegetable protein can reduce the effect of cholecystectomy in females.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**

Community Satisfaction Index as an Evaluation of Health Services Quality

Panjumi Khorida¹, Imas Sayyidati Hadidah¹, Nyoman Anita Damayanti²
¹Student of Health Policy Administration Program Study, Faculty of Public Health, Airlangga University, Indonesia, ²Lecturer of Health Policy Administration Program Study, Faculty of Public Health, Airlangga University, Indonesia

ABSTRACT

Quality control of service is the most important part in health service, so that the measurement of patient satisfaction level is absolute in effort to improve health service quality. Through these measurements, it can be known to what extent the dimensions of health services quality that have been held to meet patient expectations. This research aims to find out the result of community satisfaction index as an evaluation of health service quality in Brondong Primary Health Care of Lamongan Regency, using 9 elements taken from Permenpan Number 16 year 2014. The data were taken by observation with cross sectional study design using questionnaires analyzed descriptively. Samples were taken using Slovin formula, so that the respondent obtained 394. The measurement result shows that in general the quality of Brondong Primary Health Care of Lamongan Regency service is included in good category with CSI value of 3,050. However, when each element be viewed, there are still three elements with the lowest of community satisfaction index value indicating that there are still people who feel less satisfied with the service in Brondong Primary Health Care of Lamongan Regency. The three elements that have the lowest of community satisfaction index value are the element of service time, the service announcement, and the handling of complaints, suggestions, and inputs of the community. Therefore, this research suggests in Brondong Primary Health Care of Lamongan Regency needs to improve the quality, especially on the three elements with the lowest of community satisfaction index value.

Keywords: community satisfaction index, health service quality.

INTRODUCTION

The role and function of Primary Health Care in the implementation of Community Health Efforts and Individual Health Efforts should always pay attention to the needs of the community as a service user. In addition, it is necessary also the input and evaluation of the performance of Primary Health Care for use in efforts to improve and improve the service quality. Therefore, a system is required to get an analysis of community needs and expectations and feedback on Primary Health Care performance.

Patient satisfaction is a level of patient feeling that arises as a result of the health service performance it receives after the patient compares it to what they expect. The new patient will feel satisfied if the performance of health services obtained equal or exceeded the expectations and on the contrary, dissatisfaction will arise or the patient’s disappointment will occur if the performance of health services obtained was not as expected.

To measure the level of patient satisfaction is not easy, because the effort to obtain the necessary information to measure the level of satisfaction of the patient will be faced with a cultural constraint, so that, there is a tendency of people who are reluctant or unwilling to express criticism, especially to government health service facilities. Service user satisfaction determines the next option, willing to keep using the service or move to another health facility.

Quality is a service that can meet customer expectations and understand customer needs in the future. The quality of health services is the application
of medical science and technology to maximize health benefits without an increased risk. Furthermore, the good quality of health services when patients are served with appropriate services, both in terms of competent way of serving, good communication, decision making together and cultural sensitivity. Quality has an abstract concept. The concept of abstract quality leads to the definition of quality depending on the perspective of each individual.

Previous research conducted by Analysis of the Effect of Patient Perception about Quality of Doctor Service on Patient Loyalty in Public Policlinic of Outpatient Care Installation of Panti Wilasa Citarum, Semarang Hospital in 2008, the result of the research shows there is a significant influence between medical technical skill, attitude, the delivery of information, the timeliness of service, and the availability of the doctor’s consultation time on patient loyalty.

Brondong Primary Health Care as a public service provider is also responsible for carrying out the mandate from Permenpan and RB Number 16 Year 2014 on Guidelines for the Implementation of Public Satisfaction Survey of Public Service to obtain a Public Satisfaction Index nationally.

There are 9 elements or indicators to assess the satisfaction of society according as follows: The first element (E1) is a requirement to get service. In this element how society assess their easiness in fulfilling technical and administrative requirement to get service at government institution. Second element (E2) is the service procedures, in this element society assess the service unit of government institution based on society ease in comprehending service or procedure in the unit. The Third element (E3) is the service time, the duration in completing the service that has been determined by the service provider facilities and the accuracy of the schedule that has been determined. The fourth element (U4) is the cost/service tariff, here how the community assess the fairness and affordability of the service fee. The fifth element (E5) is a type of health service, where the community assesses the type of health services in health facilities is in accordance with the needs of the community. The sixth element (E6) is the competence / skill of the officer, where the aspect seen by the community is the skill and skill of the officer in providing the service. The seventh element (E7) is the behavior / attitude of the officers, hospitality and courteous of service providers in providing services to the community is an important point assessed by the community. The eighth element (E8) of the services ministry, which assessed is the ability of PHC officers to serve according to the standards. The ninth element (E9) is a tool for complaints of suggestions and input from the community as well as follow-up.

This study aims to determine the community satisfaction index as an evaluation of health services quality of Brondong Primary Health Care of Lamongan Regency in year 2017.

**MATERIAL AND METHOD**

The method of this research was an observational study with cross sectional study design used questionnaires analyzed descriptively. Data was collected in 2017 at Brondong Primary Health Center, while the population in this study was all patients who visited Brondong Primary Health Center for 1 year. Sampling in this study has been used Slovin formula with a fault tolerance of 5%, so that obtained 394 respondents.

Respondents were interviewed with questionnaires. The questionnaire contains questions about the level of patient satisfaction based on the elements of community satisfaction on Guidelines for the Implementation of Public Satisfaction Survey of Public Service.

The data that have been obtained, was processed in the way has been adopted from Kepmenpan Number Kep / 25 / M.PAN / 2 / 2004, on General Guidelines for Preparation of Public Satisfaction Index of Government Services Unit. Stages of data processing are as follows: First, Determine the value of weighted mean with the following formula:

\[
Weighted\ mean\ value = \frac{The\ Sum\ of\ Weight}{The\ Sum\ of\ Elements} = \frac{1}{9} = 0,111
\]

Second, determine the mean value per service element by:

The value per service element be summed up then divided by the number of respondents

Third, determine the weighted mean value of each element service by:

The mean value per service element is multiplied by the weighted mean value
Fourth, Calculation of Community Satisfaction Index of Service Unit, by adding 9 (nine) elements of weighted mean value

**Table 1. Perception values based on the Calculation of Community Satisfaction Index**

<table>
<thead>
<tr>
<th>Perception Value</th>
<th>CSI Interval Value</th>
<th>CSI Conversion Interval Value</th>
<th>Quality of Services</th>
<th>Criteria of Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissatisfied (1)</td>
<td>1,00 – 1,75</td>
<td>25,00 – 43,75</td>
<td>D</td>
<td>Not Good</td>
</tr>
<tr>
<td>Less Satisfied (2)</td>
<td>1,76 – 2,50</td>
<td>43,76 – 62,50</td>
<td>C</td>
<td>Less Good</td>
</tr>
<tr>
<td>Satisfied (3)</td>
<td>2,51 – 3,25</td>
<td>62,51 – 81,25</td>
<td>B</td>
<td>Good</td>
</tr>
<tr>
<td>Very Satisfied (4)</td>
<td>3,26 – 4,00</td>
<td>81,26–100,00</td>
<td>A</td>
<td>Very Good</td>
</tr>
</tbody>
</table>

**RESULTS AND DISCUSSION**

Based on interviews with the help of questionnaires to 394 respondents who were patients who visited Brondong Primary Health Care, the result of Community Satisfaction Index based on the calculation that has been adopted from Kepmenpan Number Kep / 25 / M.PAN / 2 / 2004 can be seen in table 2 below.

**Table 2. Calculation of Community Satisfaction Index in Brondong Primary Health Care in 2017**

<table>
<thead>
<tr>
<th>Element</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Amount</th>
<th>Weight per elements</th>
<th>Mean Value per elements</th>
<th>Weighted Mean per elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>2</td>
<td>25</td>
<td>316</td>
<td>51</td>
<td>1204</td>
<td>0.111</td>
<td>3.056</td>
<td>0.340</td>
</tr>
<tr>
<td>E2</td>
<td>0</td>
<td>27</td>
<td>318</td>
<td>49</td>
<td>1204</td>
<td>0.111</td>
<td>3.056</td>
<td>0.340</td>
</tr>
<tr>
<td>E3</td>
<td>1</td>
<td>36</td>
<td>324</td>
<td>33</td>
<td>1177</td>
<td>0.111</td>
<td>2.987*</td>
<td>0.332*</td>
</tr>
<tr>
<td>E4</td>
<td>0</td>
<td>23</td>
<td>331</td>
<td>40</td>
<td>1199</td>
<td>0.111</td>
<td>3.043</td>
<td>0.338</td>
</tr>
<tr>
<td>E5</td>
<td>1</td>
<td>24</td>
<td>320</td>
<td>49</td>
<td>1205</td>
<td>0.111</td>
<td>3.058</td>
<td>0.340</td>
</tr>
<tr>
<td>E6</td>
<td>0</td>
<td>24</td>
<td>316</td>
<td>54</td>
<td>1212</td>
<td>0.111</td>
<td>3.076</td>
<td>0.342</td>
</tr>
<tr>
<td>E7</td>
<td>0</td>
<td>24</td>
<td>306</td>
<td>64</td>
<td>1222</td>
<td>0.111</td>
<td>3.102</td>
<td>0.345</td>
</tr>
<tr>
<td>E8</td>
<td>1</td>
<td>24</td>
<td>331</td>
<td>38</td>
<td>1194</td>
<td>0.111</td>
<td>3.030*</td>
<td>0.337*</td>
</tr>
<tr>
<td>E9</td>
<td>0</td>
<td>27</td>
<td>324</td>
<td>43</td>
<td>1198</td>
<td>0.111</td>
<td>3.041*</td>
<td>0.338*</td>
</tr>
<tr>
<td>CSI value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.050</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE - * The lowest value element**

The Table 2. above Indicts that the patient satisfaction index with the quality of health service in Brondong Primary Health Care in Lamongan Regency is 3.050. If that refers to the quality of service category from Kepmenpan Number Kep / 25 / M.PAN / 2/2004, so that the health service quality of Brondong Primary Health Care of Lamongan Regency is included in category B, which means that health service quality of Brondong Primary Health Care was good.

Elements that have the highest satisfaction value is the seventh element that is the behavior / attitude of the officer with the value of Community Satisfaction Indeks (CSI) of 3.102 are included in the good category. Friendliness and courteous service providers in providing services to the community is an important point assessed by the community.

Elements that have the second highest value is the sixth element that is the competence or skill of the officer with the value of CSI of 3,076 are included in the category elements above is a potential owned by
Brondong Primary Health Care, where qualified human resources are able to provide maximum performance in an organization.

Element that has the third highest value is the fourth element that is about the type of health services with the value of CSI of 3.058 are included in either category. It is seen that the clarity of the types of services available, listed on the announcement board, banner, brochures and leaflet in Brondong Primary Health Care, and the type of health services available is the result of the survey of the needs and expectations of the community about the types of services available at the Brondong Health Center.

The element that gets the first lowest value is the third element that is about the time of service with the value of CSI amounted to 2.987. Although it is still included in the good category but needs to get attention for improvement. It is seen that many patients are queuing up and the target of waiting time service has not been achieved due to less supportive systems such as slow internet access and search for old medical records. The long waited queue will cause a negative perception on the customer about the production, the quality of service and satisfaction.

Element that got the second lowest value is the eighth element of the service information with the value of CSI 3.030. It is still seen some employees who have not implemented commitments that have been agreed together as there are still employees who arrived late and not in accordance with the specified working hours or still seen some employees are less friendly so that it can provide a negative assessment by the community.

The third lowest element is the ninth element of complaint handling, suggestion and community input with the value of CSI of 3.041. This is still an obstacle for Brondong Primary Health Care if the complaints, suggestions and inputs of society in the form of facilities and infrastructure, such as lack of seating, lack of loudspeakers, and lack of air conditioning. Comfortable environment is one of expected service by customer, while a service can be said to be qualified if it can meet customer expectations. In this context, the Primary Health Care is only able to make submission of the completeness of the higher level of infrastructure facilities, where the realization takes a long time. So that condition causes perception of dissatisfying society to health service at Brondong Primary Health Care of Lamongan Regency.

Previous research reveal on the Analysis of Influence of Patient Perception about Quality of Doctor Service on Patient Loyalty in Public Policlinic of Outpatient Care Installation of Panti Wilasa Citarum Semarang Hospital in 2008, the result of the research shows that there is a significant influence between medical skill, attitudes, delivery of information, timeliness of service, and availability of time doctor consultation on patient loyalty. Another study, entitled “Analysis of the Effect of Patient Perception about Quality of Obstetric and Gynecology Specialist Doctor With Interest of Patient Re-visit in Outpatient Care Installation of RSI Sultan Agung Semarang in 2006” showed the result of perception about the accuracy of the officers and medical technical skills affect the interest of re-visit.

The above description shows that the need to improve the quality of Brondong Primary Health Care of Lamongan Regency service to be able to increase the satisfaction of the community of health service users.

Health care user satisfaction is often used as an indicator of the quality of health services. This is because health facilities have orientation to the user (customer orientated) in ordering their services, so health facilities need to evaluate the quality of service based on the perspective of the service user. Service user satisfaction is the user’s perception and evaluation of the services they receive.

**CONCLUSIONS**

The quality of health services at Brondong Primary Health Care of Lamongan Regency based on the measurement of 9 elements or indicators adopted from Permenpan and RB Number 16 year 2014, is generally considered good by the community of Health-Care users. However, when every element have been viewed, there are still three elements with the lowest CSI value indicating that there are still people who feel less satisfied with the service Brondong Primary Health Care of Lamongan Regency. The three elements that have the lowest CSI value are the elements of service time, the service announcement, as well as the handling of complaints, suggestions and community input. Therefore, this study has been suggested that Brondong Primary Health Care of Lamongan Regency still needs to improve the quality of service, especially on the
three elements with the lowest CSI value based on the element or indicator from Permenpan Number 16 year 2014, because the satisfaction of users of health services is often used as an indicator of the quality of health services.

**Ethical Approval:** Related departments should be assured about the confidentiality of the results of questionnaires.

**Conflict of Interest:** The authors report no conflict of interest.

**Source of Funding:** Self

**REFERENCES**

Examining Preconception Care Related to Knowledge among Reproductive Age Women: A Narrative Review

Nidhi Rao¹, M Hemalatha², Nageshwar V³
¹M. Sc. Nursing 2nd year, Department of Obstetrics and Gynecological Nursing, ²Assistant Professor, Department of Obstetrics and Gynecological Nursing, ³Assistant Professor Department of Psychiatric Nursing, Teerthanker Mahaveer College of Nursing, TMU, Moradabad, U.P.

ABSTRACT

Aims: Determine the realization of women realizing for importance of optimizing health prior to pregnancy.

Background: The idea of preconception care (care before pregnancy), has came into in recent years, as a vital element, not only for improving young adult and women’s health during pregnancy birth, but future health. Preconception care is a positive new approach to upgrade the health of future children through primary intervention. Although most women have no positive attitude towards preconception care as they found that it would harm their health and will not acquire the healthy pregnancy due the certain domestic reasons or their cultural belief. Method: Pub Med-Medline, EBSCO were searched for research articles in awareness on preconception care among women of reproductive age and found little awareness regarding preconception care. Results: Out of 9 articles, 6 research studies supported that awareness regarding preconception care revealed that variation in the level of awareness. Conclusion: The review concludes that awareness on preconception care reveals very low level of awareness. Clinical significance: Preconception care is to reduce the risk of unfavorable health effect for the women and unborn baby by optimizing the women health awareness before planning and conceiving pregnancy.

Keywords: Awareness, Preconception care, and Reproductive age women.

INTRODUCTION

Preconception care (PCC) aims to promote the health of women of reproductive age before conception, while preventing pregnancy-related outcomes such as low birth weight, premature birth, and infant mortality.

The beginning of Preconception care was started to prevent low birth weight. Then later it came with slogan “Caring for Our Future,” Preconception care first developed in developed countries like London, Britain etc. Preconception care is a set of planning that aim to analyze and reshape the biomedical, behavioral, and social risks to a woman’s health or pregnancy outcome through prevention and management.

Preconception health care is a protection given to a woman before pregnancy to manage conditions and behaviors which could be a risk to women and baby. It targets those particular women who are never been pregnant as well as the women who could be pregnant in the near future. The key for encouraging the preconception health is to meet the effective medical care, healthy behavior, strong support and safe environment at home and at work.

It is targeting the existing risk before pregnancy where by using the beneficial resources for enhancing the improvement of reproductive health and optimizing the knowledge before conception and it provides the chance to intervene prior for to optimize health of the potential mothers and prevent from affecting the fetus.

Address for Correspondence:
Ms. Nidhi Rao
M.Sc. Nursing 2nd year, Department of Obstetrics and Gynecological Nursing, Teerthanker Mahaveer College of Nursing, TMU, Moradabad-244001, Uttar Pradesh, India, E-mail: msnidhirao1994@gmail.com
Phone no: 8953433963, 7985031549
Preconception care is a very strenuous task for engaging the public for the awareness as it is a form of patient care or an intervention provided to the women of an reproductive age, or the women who enters in child bearing age or having the desires of before pregnancy to improve the health outcomes and prevent from any deleterious effect over the health of the mother and fetus.

Worldwide in 2010, 287000 women died, 3.1 millions newborn babies died in their first month of life while 14.9 million were born prematurely and 2.7 million were stillborn. These statistics represents that due to the following risk factors are associated to change the health of the mother and child or severely it effected the entire process of healthy outcome behavior which results death. Hence need of preconception care is necessary for further reduction in the risk of fetal and maternal deaths and the planning of intervening services are more in range so as to reduce the problems.

In India very less number of Women received Preconception Care. National Family Health Survey (NFHS) found that 37 percent of all pregnant women not received the preconception care during their pregnancies where 13% of literate women received the preconception care as compared to half of illiterate who have not received care and this survey analyses the various additional services are engaging a women in preconception care so as to improve the healthy behavior and indented the most of pregnancies result in good maternal and fetal outcomes, some pregnancies may result in adverse health effect for the women and fetus and some of these outcome cannot be prevented.

Optimizing a women health so there is a need to identify the barrier to preconception care and introducing the risk reduction intervention and screening methods to a women of child bearing age and may contribute in the reduction of maternal and infant mortality rates.

**METHODOLOGY**

**Search strategy method-**

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

**Types of studies:** descriptive Cross-sectional studies, qualitative, mixed longitudinal descriptive and survey study

**Type of participants:** Community women, health care workers, health professional workers.

**Setting:** Maternal and health care centers and community areas.

The systematic search was conducted by framing the terms separately and in combination with the different variables with different search terms. In addition to this, a manual Pub Med search and EBSCO was undertaken by using the keywords and search synonyms and found the relating articles, in addition where 9 articles were found. Initial search retrieved 1382 articles over which 116 articles were selected manually. Duplicates were removed and 40 articles were reviewed for eligibility. 76 articles were excluded because they don’t match with the study criteria. 21 more studies were excluded due to subscription and ten articles due to irrelevant content. Finally nine articles were selected where six were quantitative and two were qualitative and one was mixed longitudinal descriptive studies. These articles are supporting the used study.

**DISCUSSION**

The quantitative studies conducted on knowledge regarding preconception care among the women were reviewed. Most of the studies were conducted in foreign countries including North west Ethiopia, Malaysia, Nigeria, Australia, Jordan, England, London and concluded that women were having less knowledge on preconception care.

According to Adeoye Tokunbo O et al, 2017, it concluded that there is high level of awareness among health workers especially in doctors about 83.3%. Introduction of various in training services in professional education will ultimately improve the knowledge and awareness of preconception care services.

According to Yitayal Ayalew et.al, 2016, finding showed that overall 27.5% of women are aware of preconception care indicated very low level of awareness and suggesting that there is a need to give importance for delivery of health education about preconception care to a woman in order to increase their knowledge.

According to Prashana Gautam et.al, 2016, finding showed that overall 27.5% of women are aware of preconception care indicated very low level of awareness and suggesting that there is a need to give importance for delivery of health education about preconception care to a woman in order to increase their knowledge.

According to Prashana Gautam et.al, 2016, Overall 57.3% belongs to the highest level of knowledge in the area of reproductive health risk factors and the lowest in an area of health promotion and suggested that initiation of education programme on different aspects
of preconception care will improve the health risk and obtain the healthy future outcomes \cite{3}

According Roshanani Bkasim et al 2016, majority of participants had good knowledge, attitude and practice towards preconception care was about 98%, 45.2% and 51.9%. Pre-pregnancy care information can be integrated into educational programmes especially in secondary schools and this information should also be provided to all women who attend antenatal clinics \cite{4}

According to N.A. AL-Akour et al, 2015 revealed that nearly 50% of the participants were awarded about preconception care associated factor. Majority of women and men are aware of the changes that should be made prior to conception \cite{5}

According to Judith Stephenson et al, 2016, revealed that 20 professionals expressed the low level of awareness regarding preconception health situations and ignorance about responsibility for delivery of preconception care and declares linkage between the health professionals input and healthy behavior before the pregnancy will improve the awareness and brings wider benefits for public health \cite{6}

According to S. Braspenningx et al, 2013, a systematic review on awareness, current situation and recommendation of future aspects of preconception care, Forty-six articles were identified for review and it shown that preconception care that might be result in excellence pregnancy outcomes, including e.g. a reduction of congenital abnormalities. Health care workers are in favor of the implementation of preconception care, but claim that they don’t have enough knowledge to do so. In results the general population shows interest in receiving the preconception care and wanted to increases the awareness of preconception care and this should be implemented in terms of checklist and health education \cite{7}

According to Helena Toumainen et al, 2013, the results suggested that Women had modest or poor awareness of preconception health issues and the study concluded that raising preconception health will improves the pregnancy outcomes \cite{8}

According to Eric AP Steegers et al, 2012, Women expressed a positive attitude towards preconception care. Due to some aspects or subjective norms around the process of becoming pregnant may falling out with the current practice of preconception care. There is a Need for enhancing the awareness by adopting the following interventions and education programme among the women \cite{9}

According to Keith A. Frey et al, 2006, Majority of women understand the importance of optimizing their health prior to preconception and there is a need to forming the focused group so that entire women will be involved to improve the deficiencies over the health of the mother and fetus \cite{10}

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 FINDINGS

The available literature is refined to get six quantitative, two qualitative and one mixed approach.

Out of Nine articles, six research studies findings are showing the awareness on preconception care of a woman and categorized the level of awareness as low, poor, average and good. Under these categories the awareness was seen and found that majority of women have poor awareness regarding various aspects of preconception care.

Most of the studies were refined and concluded that recommendation is necessary to cover all reproductive age women under the boundaries of preconception programmes and services so as to reduce the harmful impact over the health of the mother and child. Five articles show the majority of women have the modest or poor awareness of preconception health issues. They perceived that it can be reduced by addressing the preconception care in different areas of perspectives and as found that challenges faced by women is critical to achieve preconception care due to the following factors like unawareness of family planning, health lifestyle, smoking/alcohol, folic acid supplementation etc.

FUTURE SIGNIFICANCE

Based on this review the finding reveals that majority of women have lack of knowledge on preconception care which is greatly playing an undesirable effect over the health of mother and fetus. To overcome the problems there is a need to improve the preconception care health and pregnancy outcomes and this will protect
the mother and fetus from various associated factors affecting the health. It will lead to improve maternal nutrition, tackle obesity, related issues, under nutrition and micronutrients deficiencies. In order to decrease the mortality and morbidity rate. Various maternal services and programmes will be performed so that every individuals will be saved and acquire healthy pregnancy in a future

Nearly half of the pregnancies in United State are unplanned. Therefore the challenges of preconception care are more progressed. It is not only addressing the pregnancy planning but also address the women who are seeking for the medical consultation and care to secure their health but they failed to approach due to the cultural and educational barriers. The introduction of various educational programmes and screening programme for the women of child bearing age on an ongoing basis will analyse the prospective of maternal-fetal risk and hazard before and between the pregnancies.

Several national and international medical organization and advocacy group have focused on the promotion of health before conception, resulting in development of clinical recommendation and education materials and clinician will encourage the women to formulate the reproductive health plan so it will promote the healthy pregnancy outcomes.

CONCLUSION

Majority of studies highlights that education is needed to improve the level of knowledge on different aspects of preconception care among reproductive age women. Initiating the offer of preconception health intervention at this point is needed. First, and for most step is to give importance for those who belongs to deprived backgrounds, so that it will increases the potential to engage them in health educational programmes of preconception care and improves the knowledge regarding preconception care.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


12. Braspenningx S, Haagdorens M, Blaumeiser B,

van der Zee B. Preconception care: concepts and perceptions: An ethical perspective. 2013 Feb

Impact of Parental Stress on Body Mass Index of Children

Aditya Pareek¹, Uma Joshi²
¹Research Scholar, Amity Institute of Behavioral and Allied Sciences (AIBAS), Amity University Rajasthan, Jaipur;
²Dean Humanities, Social Science and Liberal Arts; Director Amity, Institute of Behavioral and Allied Sciences (AIBAS), Amity University Rajasthan, Jaipur

ABSTRACT

Background: India is undergoing a rapid epidemiological and nutritional transition characterized by persistent nutritional deficiencies, as evidenced by the prevalence of children suffering from stunting, anemia, and iron and zinc deficiencies. Subsequently, there is a steep rise in the prevalence of childhood obesity, diabetes, cardiovascular disease etc. The impact of obesity or underweight upon a child’s mental health, immediate and future social life is as important as the impact on physical health. So, the need of the hour is to address child’s weight-related problems of being obese or underweight at an early stage of life in connection with their primary care and primary care giver/parents.

Aim: To assess the impact of parental stress on body mass index of children within Indian school setting.

Method: A sample of 250 students and their parents were contacted personally to obtain information on parental stress scale and body mass index of children. Students with the age range of 10-14 years (grade IV-IX) from three different schools of Jaipur city.

Result: The findings of the present study found to be statically significant that there is a difference in parental stress level associated with children’s BMI.

Conclusion: Present study paves the way for future studies examine the relationships of parental stress with body mass index of children, as well as BMI on academic performance. The findings suggest that higher level of parental stress leads to higher level of BMI in children which could possibly lead to poor academic performances within a period of middle school aged students.

BACKGROUND

Childhood obesity is one of the major public health challenges of the 21st century. The problem is encompassing globally and is rapidly affecting many underdeveloped and developed countries, particularly in urban settings¹. Globally in 2016, the number of overweight infants and children is estimated to be over 42 million and about 35 million of these are living in developing countries¹.

India is undergoing a rapid epidemiological and nutritional transition characterized by persistent nutritional deficiencies, as evidenced by the prevalence of children suffering from stunting, anemia, and iron and zinc deficiencies²,³. Subsequently, there is a steep rise in the prevalence of childhood obesity, diabetes, cardiovascular disease etc. Studies from different regions of India within last decade are also evident of similar trend²,³. This trend has been challenging over recent years and can be presently considered as different forms of the National malnutrition problem.

The most surprising aspect of all the attention is being paid to the prevalence with numbers and figures and physical consequences of childhood obesity without going in depth of the problem and its global perspective. But, this alone can not solve the severity of the problem. The impact of obesity upon a child’s mental health,
immediate and future social life is as important as the impact on physical health. So, the need of the hour is to address the wider issues of child’s weight-related problems of being obese or underweight at an early stage of life in connection with their early care and primary care givers/parents (for e.g. Can parental stress lead to abnormalities related to BMI (underweight/overweight). The parent becomes a model for the child. The child observes how the parents and other people around them respond to the child’s needs. The child learns to adapt their behaviour to suit their environment therefore, children often repeat their parent’s behaviours, which may then be carried into their adulthood. Some previous studies found a relationship between stressful events or situations (stressors) resulting in negative physiologic or psychological responses (stress) in parents of obese and underweight children. There are several mechanisms for how parent stressors can influence child obesity development. Parents experiencing multiple stressors or who perceive that they are under stress may spend less time with their children, use less effective parenting approaches, or both. This can yield less supervision for children, who may make unhealthy food and activity choices resulting in overweight or underweight. Similarly, stressed parents may be less likely to model and encourage their children to engage in physical activity as they may be a sign of risk towards obesity.

Parent stressors that have been associated with childhood obesity and underweight include poor physical and mental health, financial strain, and single-family households. Although, multiple stressors of parents can elicit a “stressor pile-up” causing adverse physical health consequences in children and a number of studies have examined associations between dietary and psycho-social factors and prevalence of underweight, overweight, and obesity at the International level (i.e. American states, Arab states) little research has examined similar associations in India. Therefore, the primary aim of the present study is to assess the impact of parental stress on body mass index of children within Indian school setting.

MATERIALS AND METHOD

Study design:

A school-based ex-post facto study with contrast group comparison was conducted in three private schools from different parts of Jaipur city of Rajasthan state after obtaining permission from the school administration, parents and children. The study was conducted over a short period of three months from August to October 2017 to avoid the examination related stress issues with children, parents and school administration to interfere with the results of the present study. This is not an intervention based research and no clinical trials on samples were conducted. The synopsis of this study has gone through stringent evaluation by Students Research Degree Committee with an external member in it.

Participants:

Present study included 250 students, with equal number of males and females in the age range of 10 to 14 years (enrolled in class V to IX) attending regular school and their parents. Students School Principals, Class Teachers and Parental consents were obtained through a circular explaining the purpose and procedure of the study. Those present at the time of study and consented to participate were included in the study.

The socio-demographic characteristics of the sample included their religion (Hindu/non-Hindu), diet pattern (vegetarian/non-vegetarian), academic records, and number of siblings. The sample selected was from three different private schools of Jaipur city with comparable fee structure and parental education, justifying the similar socio-economic status of these children.

The justification for choosing the sample for this age group was:

1. There is a steep rise of obesity among school going children and the age of onset is declining. To nib at bud this psychosomatic disorder, we need to identify its correlates at an early age to evolve preventive and curative measures.

2. The age group of 10-14 years fall in pre-adolescence where usually the body starts taking shape with pubertal changes. Adolescents of 10-14 years of age constitute a homogeneous group who have characteristics similar, have knowledge about health promoting and health hindering life style to some extent. They start taking independent decisions about themselves and their lifestyle and food choices. Younger children are more dependent on their parents in their lifestyle (selection, amount and frequency of food, screen time and sleep patterns). Moreover, relationship
with parents develop and impact health gradually, and it seems the right time to study these health dynamics in relation to parental stress.

3. Students of grade V to IX are not hassled by board exams, competitions, and future career issues, compounding to adaptive behaviors like over or under eating.

**Exclusion criteria**

Those students/parents did not give the written consent to participate in the study.

Those who were taking treatment for certain alignments.

**Procedure:**

Parental stress scale developed by Berry and Jones (1995) based on a 5 point scale with satisfactory levels of internal reliability (.83), and test-retest reliability (.81) and satisfactory convergent validity with various measures of emotions, role satisfaction, perceived stress, marital satisfaction, job satisfaction and social support.

Body mass index of children was measured by BMI machine (Model-Omeron HBF-121). Criteria for measuring BMI - Underweight - a percentile range of less than 5, Normal weight – a percentile range of 5 to less than 85, Overweight - a percentile range of 85 to less than 95 and Obese - a percentile range equal to or greater than 95.\(^{15,16}\)

Statistical Package for Social Sciences, Version 22 for Windows (SPSS 22) was used to analyze the quantitative data. One way ANOVA was computed and .05 level of confidence was used to interpretate the results of the present study.

**FINDINGS**

Table. 1 Mean, standard deviation of parental stress on body mass index of children

<table>
<thead>
<tr>
<th>Body Mass Index</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>37.95</td>
<td>4.379</td>
</tr>
<tr>
<td>Underweight</td>
<td>49.72</td>
<td>7.393</td>
</tr>
<tr>
<td>Obese</td>
<td>74.50</td>
<td>8.069</td>
</tr>
<tr>
<td>Total</td>
<td>54.92</td>
<td>17.869</td>
</tr>
</tbody>
</table>

Table.1.2. F value of parental stress and body mass index in children

<table>
<thead>
<tr>
<th>Source</th>
<th>Df</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>2</td>
<td>767.407</td>
<td>.000*</td>
</tr>
<tr>
<td>Intercept</td>
<td>1</td>
<td>14734.123</td>
<td>.000</td>
</tr>
<tr>
<td>BMI</td>
<td>2</td>
<td>767.407</td>
<td>.000</td>
</tr>
</tbody>
</table>

*Significant at (p=.01)

Table 2. Chi square value, df and significance value of body mass index in children and their academic performance

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>121.747*</td>
<td>.000*</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>137.282</td>
<td>.000</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>99.742</td>
<td>.000</td>
</tr>
</tbody>
</table>

*Significant at (p=.01)

Figure 1. Body mass index and academic performance of children
DISCUSSION

The findings of the study are very promising and conclusive showing a clear trend of how parental stress relates with BMI. The F ratio of parental stress and BMI of their children of the present study found to be statistically significant \( (F = 767.407, \text{df}=2, p=0.00) \). The results clearly show that the parental stress of children with body mass index labelling them as obese or overweight was significantly high. Moreover, the mean of parental stress of children with different BMI provides a clear difference (mean of obese/overweight children found to be 74.50 and mean of normal and underweight children 37.95, and 49.72 respectively). The findings support studies indicating positive relationship between parental stress with overweight and obesity in children. The probable reasons could be that stress in parents leads to poor family functioning and poor communication which involves the disturbed emotional, physical and psychological activities between family members and has been found to be strongly associated with childhood obesity. Moreover, parental stress have also been associated with poor parenting style such children who experience authoritarian and neglectful parenting have higher risk of being overweight/obese. Parental Stress also influences their attachment style with their children. When children relate and interact with high stressed parents, they develop insecure attachment style (avoidant or anxious attachment style) which is associated with disturbed weight regulation in children. House and professional demands (i.e. family environment, interpersonal relation, their education or socio-economic status combined with host of other variables) act as the major reason for stress among parents, which could be associated with higher/lower metabolic syndrome in children. Many chronically stressed parents become chain smokers and consume excessive alcohol or drugs and become habitual drinkers/addicts. Such pathological behaviours of parents can directly affected the child mental and physical health responsible for child obesity or underweight. The present evidences shows that parental stress can be a strong predictor of higher or lower than normal BMI levels in children.

Although the academic performance of children was unaffected by the stress of parents, but it is noteworthy that the body mass index of children was found to be stastically significant with academic performance of children \( (x^2=121.747, \text{df}=4, p=.00; \text{table 2; figure 1}) \) in the present study. Significantly greater numbers of children having obese/overweight or underweight scored average or poor performance and children with normal BMI were found to be good in their academic performance. Some previous studies support these findings by reporting the association of cognitive abilities, poor nutrition and BMI, stating that cognitive ability is influenced by obesity and the likelihood of being obese is influenced by the quality of nutrition, so poor nutrition is associated with obesity leading to poor academic performance of child. However, not all available studies have found a positive association between BMI and academic performance. Such observations suggest that obesity is a complex problem there are so many factors which could be responsible for increase and decrease of body mass index of children.

FUTURE DIRECTION AND CONCLUSION

Since, this study was conducted only in three modern high schools of the Jaipur (Rajasthan) with a small sample of 250, a similar study of larger population from diverse locations and demographic specifications could be planned for greater generalizability of the study and results could be treated with more cross sectional and longitudinal researches. Separate stress responses of father and mother along with an account of stress level of children with different BMI could be taken and evaluated for better understanding of these complex demograpic and psycho social health issues.

In order to address the problem associated with BMI of school children we need to address the problem of stress of their parents. Interventions to reduce parental stress, household stress, environmental stress for the parents are required to help them to cope with stress might help to reduce obesity and underweight in children. Interventions to alter and create healthy home environment has to be stressed. Educational support to children and counselling facilities for their stressed parents might help in providing healthy life style including diet and exercise behaviours in children to foster healthy habits and optimum growth in children.

Present study paves the way for future studies with more robust and comprehensive research designs and examine the relationships of parental stress mental health with body mass index of children as well as their academic performance.

Conflict of Interest: The author(s) declare that they
have no competing interests.

REFERENCES


Utilisation of Janani Suraksha Yojana among Women in Urban and Rural Areas of Western Uttar Pradesh

Shalki Mattas¹, Bhawana Pant², Saurabh Sharma³, Arvind Shukla³

¹Postgraduate Resident, ²Professor, ³Assistant Professor, Department of Community Medicine, Subharti Medical College, Meerut

ABSTRACT

Background: In April 2005, under the National Rural Health Mission, the Government of India launched a scheme known as Janani Suraksha Yojana (JSY). It aims to promote institutional deliveries among pregnant women living below poverty line in all the states and Union Territories of the country with special focus on low performing states. Aims & Objectives: To find out the extent of utilisation of the JSY scheme by rural and urban women in the community. Material & Method: The present study was done in the catchment area of rural and urban health and training centre of Subharti Medical College. The sample size was 150 each in urban and rural area. Findings: Complete antenatal care was received by only 19.2% of the beneficiaries. 24% of the beneficiaries in urban area and 17% of the beneficiaries in rural area received complete antenatal care. Among the women who registered under JSY, 71% of the women received money after delivery in rural area and 82% of the women received money in urban area.

Keywords: Janani Suraksha Yojana; Utilisation; Urban; Rural; Western Uttar Pradesh.

INTRODUCTION

Mother and child constitute a priority group in a community. They comprise of approximately 57.5% of the total population and constitute a vulnerable group.¹

In April 2005, under the umbrella of National Rural Health Mission (NRHM) in response to the slow and varied progress in improvement of maternal and neonatal health, the Government of India launched a scheme known as Janani Suraksha Yojana (JSY).²

The scheme aims to promote institutional deliveries among pregnant women living below poverty line in all the states and Union Territories (UTs) of the country with special focus on low performing states (LPS). In Uttar Pradesh, about 2.33 million beneficiaries have been benefited under JSY in 2014-15.

METHOD

The present study was conducted in Khajoori area (RHTC) and Multan Nagar area (UHTC) of the department. The sample size was calculated using prevalence of institutional delivery taken from National Family Health 2005-06 Survey (NFHS-3) India-Uttar Pradesh which was 22%³ and was rounded off to 300, 150 each from rural and urban area, respectively. Fourteen colonies are covered under UHTC, there were 3300 families residing there, out of which 488 families had married females above 19 years who had delivered in the past one year and seven villages are covered by RHTC, there were a total of 4436 families with 627 families having married females above 19 years who had delivered in the past one year. Number of families to be included in the study from each selected colony was calculated by proportion method using a simple proportion formula.⁴

\[ n_i = nN/N \]

Where, \( n_i \) = sample size in \( i^{th} \) stratum.
\( n \) = Total sample size.
FINDINGS

Table 1 shows that out of the total 182 beneficiaries who were aware about JSY, 164 (90%) beneficiaries got registered under JSY, 113 of which belonged to rural area and 51 were from urban area. 83.5% of the beneficiaries went for at least 3 antenatal checkups, 91.2% got the appropriate doses of Tetanus Toxoid and only 28.6% consumed 100 tablets of Iron and Folic Acid (IFA). Only 10.2% of the women in rural area and 7.3% of beneficiaries in urban area were given postnatal care under JSY. BCG and Zero polio were given to approximately 94% of the babies of the beneficiaries and all the beneficiaries were given advice on breastfeeding. The difference in the number of beneficiaries who had minimum three antenatal checkups in rural and urban areas was seen to be statistically significant.

Complete Antenatal care (ANC) includes beneficiaries who went for 3 or more ANC visits, 2 doses of TT or booster dose and received 100 IFA tablets. Table 2 shows that overall, Complete ANC was received by only 19.2% of the beneficiaries. 24% of the beneficiaries in urban area and 17% of the beneficiaries in rural area received complete antenatal care.

In the present study, 38.3% beneficiaries had to travel <5km to the place of delivery, 41.8% travelled 5-10km, 17.7% travelled 11-20km and 2.1% travelled >20km to their place of delivery. The distance of place of delivery from residency varied in rural and urban areas and this was seen to be statistically significant. It was observed that many of the beneficiaries went to district and tertiary care hospital at their own will or referral from peripheral hospital (PHCs/CHCs) due to lack of Basic Emergency obstetric care services. 61% of beneficiaries used hired vehicle to reach the place of delivery, 39% had personally owned vehicle. Amount incurred on transportation was reimbursed in just 1.4% cases.

70% of the deliveries in the rural area and 60% of the deliveries in the urban area were conducted in an institution. Government facilities were the most common institution for delivery in both rural and urban areas with 84% and 58% of the institutional deliveries, respectively. Accredited Private facility accounted for only 1% of the institutional deliveries in rural area and for about 14% institutional deliveries in urban area. 15% and 28% of the institutional deliveries in rural and urban areas, respectively were conducted in other private facilities. This distribution was seen to be statistically significant.

Table 3 shows that 100% of the beneficiaries in rural area and only 29% of the beneficiaries in urban area were contacted/ advised for institutional delivery during pregnancy and this variation was seen to be statistically significant. Grassroot level workers (65%) followed by Others (22%) were the most common people to advise for institutional delivery in rural area while Other sources (51%) followed by Doctor (36%) were the most common sources in urban areas and this distribution was statistically significant. Place of delivery was identified in advance in 69.8% of the beneficiaries who were aware about JSY. In rural area, Doctors conducted the delivery in 69% of the beneficiaries aware about JSY while in urban, 78% of the deliveries were conducted by doctors.

Table 4 shows that among the women who were registered under JSY, 71% of the women received money after delivery in rural area and 82% of the women received money in urban area. More than three fourth of the beneficiaries received money within a week after discharge in both rural and urban area. 90% of the rural beneficiaries and 93% of the urban beneficiaries received the appropriate amount of money for their respective areas.
Table 1: Antenatal, Natal and Postnatal Services Received by the JSY Beneficiaries (Type of maternal / child care services received)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>RURAL (n=127)</th>
<th>URBAN (n=55)</th>
<th>TOTAL (n=182)</th>
<th>χ²</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration during pregnancy</td>
<td>Yes</td>
<td>113</td>
<td>89.0</td>
<td>51</td>
<td>92.7</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>14</td>
<td>11.0</td>
<td>4</td>
<td>7.3</td>
</tr>
<tr>
<td>At least three ante natal check-ups</td>
<td>Yes</td>
<td>101</td>
<td>79.5</td>
<td>51</td>
<td>92.7</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>26</td>
<td>20.5</td>
<td>4</td>
<td>7.3</td>
</tr>
<tr>
<td>Appropriate doses of TT</td>
<td>Yes</td>
<td>117</td>
<td>92.1</td>
<td>49</td>
<td>89.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10</td>
<td>7.9</td>
<td>6</td>
<td>10.9</td>
</tr>
<tr>
<td>Consumed 100 tablets of IFA</td>
<td>Yes</td>
<td>35</td>
<td>27.6</td>
<td>17</td>
<td>30.9</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>92</td>
<td>72.4</td>
<td>38</td>
<td>69.1</td>
</tr>
<tr>
<td>Post natal care</td>
<td>Yes</td>
<td>13</td>
<td>10.2</td>
<td>4</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>114</td>
<td>89.8</td>
<td>51</td>
<td>92.7</td>
</tr>
<tr>
<td>BCG to the child</td>
<td>Yes</td>
<td>122</td>
<td>96.1</td>
<td>49</td>
<td>89.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>5</td>
<td>3.9</td>
<td>6</td>
<td>10.9</td>
</tr>
<tr>
<td>Zero polio to the child</td>
<td>Yes</td>
<td>119</td>
<td>93.7</td>
<td>53</td>
<td>96.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>8</td>
<td>6.3</td>
<td>2</td>
<td>3.6</td>
</tr>
<tr>
<td>Advice on breast feeding</td>
<td>Yes</td>
<td>127</td>
<td>100.0</td>
<td>55</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 2: Distribution of beneficiaries according to the Complete Antenatal care Services received by them.

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>RURAL (n=127)</th>
<th>URBAN (n=55)</th>
<th>TOTAL (n=182)</th>
<th>χ²</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Antenatal care</td>
<td>Yes</td>
<td>22</td>
<td>17</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>105</td>
<td>83</td>
<td>42</td>
<td>76</td>
</tr>
</tbody>
</table>

Table 3: Distribution of the beneficiaries with regard to details regarding preparation for institutional delivery

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>RURAL (n=127)</th>
<th>URBAN (n=55)</th>
<th>TOTAL (n=182)</th>
<th>χ²</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whether anyone contacted/advised during pregnancy for institutional delivery</td>
<td>Yes</td>
<td>127</td>
<td>100</td>
<td>16</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>39</td>
<td>71</td>
</tr>
<tr>
<td>Person who contacted/advised for institutional delivery</td>
<td>Grassroot Worker</td>
<td>82</td>
<td>65</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Doctor</td>
<td>17</td>
<td>13</td>
<td>20</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>28</td>
<td>22</td>
<td>28</td>
<td>51</td>
</tr>
</tbody>
</table>
Cont...Table 3: Distribution of the beneficiaries with regard to details regarding preparation for institutional delivery

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>RURAL (n=80)</th>
<th>URBAN (n=42)</th>
<th>TOTAL (n=122)</th>
<th>χ²</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of place of delivery in advance</td>
<td>Yes</td>
<td>89</td>
<td>70</td>
<td>38</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>38</td>
<td>30</td>
<td>17</td>
<td>31</td>
</tr>
<tr>
<td>Person who conducted the delivery</td>
<td>Doctor</td>
<td>87</td>
<td>69</td>
<td>43</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Nurse</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>33</td>
<td>26</td>
<td>10</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 4: Details regarding Receipt of Cash Incentives under JSY

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>RURAL (n=80)</th>
<th>URBAN (n=42)</th>
<th>TOTAL (n=122)</th>
<th>χ²</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of receipt of money</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At time of discharge</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Within a week after discharge</td>
<td>59</td>
<td>74</td>
<td>30</td>
<td>71</td>
<td>89</td>
</tr>
<tr>
<td>Within 2-4 weeks after discharge</td>
<td>12</td>
<td>15</td>
<td>5</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>More than 4 weeks after discharge</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Total amount received (in Rs.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As per JSY guidelines</td>
<td>72</td>
<td>90</td>
<td>39</td>
<td>93</td>
<td>4</td>
</tr>
<tr>
<td>Less than the JSY guidelines</td>
<td>8</td>
<td>10</td>
<td>3</td>
<td>7</td>
<td>44</td>
</tr>
<tr>
<td>Type of problems faced in receiving the money</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No problem</td>
<td>69</td>
<td>86</td>
<td>34</td>
<td>81</td>
<td>103</td>
</tr>
<tr>
<td>Made several contacts to receive money</td>
<td>11</td>
<td>14</td>
<td>8</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Person who paid the money</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By Health worker</td>
<td>30</td>
<td>38</td>
<td>12</td>
<td>29</td>
<td>42</td>
</tr>
<tr>
<td>Direct to account</td>
<td>50</td>
<td>63</td>
<td>30</td>
<td>71</td>
<td>80</td>
</tr>
</tbody>
</table>

DISCUSSION


The study found that 83.5% had more than three antenatal checkups and it was higher (92.7%) in urban than in rural areas (79.5%). Similar findings were seen in studies conducted Dolma Y, et al (2015)7 and Panja T.K., et al (2012)8.

In our study, 91.2% beneficiaries got the appropriate doses of Tetanus Toxoid and only 28.6% consumed 100
tablets of IFA. In Annual Health Survey (AHS) 2012-2013, it was found that mothers who received at least one Tetanus Toxoid (TT) injection were 83.2% in rural UP, 88% in urban UP and 84.1% in total and 82.9% in rural Meerut, 86.5% in urban Meerut and 84.3% in total. Mothers who consumed IFA for 100 days or more were 8.3% in rural UP, 16% in urban UP and 9.7% in total and 12.3% in rural Meerut, 16.4% in urban Meerut and 14% in total. NFHS IV (2015-16) data shows that in Uttar Pradesh, 86% mothers in rural and 88.5% mothers in urban UP received protection against neonatal tetanus in their last birth. Only 10.9% mothers in rural UP and 20.2% mothers in urban UP consumed IFA tablets for 100 days or more. The indicators in Meerut were in general found better than those of Uttar Pradesh. Mothers whose last births was protected against neonatal tetanus were 91.1% in rural Meerut and 86.1% in urban Meerut. Similar results have been shown as per the report of DLHS (2002-2004).

Complete Antenatal care was received by 19.2% of the beneficiaries in our study with 17% and 24% beneficiaries in rural and urban areas, respectively, receiving complete antenatal care. Similar results were observed by Kumari V, et al where Complete ANC was availed by 25.5% of the women. According to NFHS IV data, in rural India, only 16.7% mothers had full antenatal care while it was 31.1% in urban India. Complete antenatal care was received by 3.8% mothers and 13.5% mothers in rural and urban UP, respectively.

In the present study, 70% and 60% deliveries in rural and urban area, respectively were conducted in an institution. According to NFHS IV, 78.9% deliveries in India occur in an institution and 75.1% and 88.7% in rural and urban areas, respectively. Similar results were also found in the studies done by Vora SK., et al(2009). Findings of the present study reflect the role of ASHA in motivating women for institutional delivery. Of all the women who were aware about JSY, 100% beneficiaries in rural area and only 29% beneficiaries in urban area were contacted/advised for institutional delivery during the course of pregnancy. Similar pattern was seen in the study by Dolma Y, et al’ where ASHA were the source of motivation in 58.1% followed by doctor in 20% cases and ANM (16.3%) while 3.7% cases got motivated through other channels like TV, Radio, friends, relative and 2% of women were motivated by AWW.

CONCLUSION

Out of the total 182 beneficiaries who were aware about JSY, 164 (90%) beneficiaries got registered under JSY, 113 of which belonged to rural area and 51 were from urban area. Complete antenatal care was received by only 19.2% of the beneficiaries of which 24% of the beneficiaries belong to urban area and 17% of the beneficiaries were from rural area. 70% of the deliveries in the rural area and 60% of the deliveries in the urban area were conducted in an institution. Amount incurred on transportation was reimbursed in just 1.4% cases. Among the women who were registered under JSY, 71% of the women received money after delivery in rural area and 82% of the women received money in urban area.

Ethical Clearance: Ethical clearance was obtained.

Conflict of Interest: None

Acknowledgement: Nil

REFERENCES

6. Banerjee B.A. Qualitative Analyses of Maternal and child health services of an urban health centre by assessing client perception in terms


Comparison of Microleakage in Repairing Furcal Perforations in Biodentine with Cyanoacrylate and Biodentine alone: an Invitro Study

Aditya Shetty¹, Anuj Varshney², Lakshmi Nidhi Rao¹, Mithra N Hegde⁴, Tony Mathew³, Chitharanjan Shetty³

¹Additional Professor; ²Post Graduate Student, ³Lecturer, ⁴Head of the Department, Abshetty Memorial Institute of Dental Sciences Derlakatte, Mangalore

ABSTRACT

Perforations in the furcation region are one of the major complications leading to failure of endodontic treatment and causes significant impact on the long term prognosis of the tooth. It is estimated that furcation perforation is the second major cause of failure in endodontics. Biodentine is a calcium silicate-based bioactive material. It is a powder liquid system, powder composed of Tri-calcium silicate, Di-calcium silicate, Calcium carbonate and oxide, Iron oxide, Zirconium oxide. Liquid consist of Calcium chloride, Hydro soluble polymer. It is easy to handle owing to its ease of manipulation and a short setting time approximately 12 minutes, has high alkaline pH and is a biocompatible material making it a favourable material for perforation repair, whereas cyanoacrylate has been shown to be an excellent tissue adhesive and hemostatic agent which is well tolerated by the tissues of the oral cavity, promotes healing of the tissues. Hence, this study would compare the microleakage of mineral trioxide aggregate and cyanoacrylate cement, in repairing furcal perforations using 2% methylene blue dye solution, conc. Nitric acid, ELISA plates for detecting the maximum dye leakage.

Keywords: Perforations, bioactive material, short setting time, tissue adhesive, hemostatic agent, microleakage

INTRODUCTION

In endodontic practice procedural accidents are encountered that will affect the prognosis of root canal space therapy.¹

One of these accidents is endodontic perforation; which can often result in the loss of tooth.¹

The root perforation can be repaired surgically, but a furcation perforation is surgically inaccessible.¹

Therefore, furcal perforations have a more unfavorable prognosis than the perforations occurring in the middle and apical root thirds.¹

Repairing a perforation plays a vital role in preventing bacterial contamination of the furcal area. Hence a material which is used for sealing should provide an adequate seal, be biocompatible, and should be bactericidal.

Amalgam, Cavit, Super-EBA, glass ionomer cements and resins are materials used for sealing furcal perforations.²

Biodentine is a high-purity calcium silicate–based dental material composed of tricalcium silicate, calcium carbonate, zirconium oxide, and a water-based liquid containing calcium chloride as the setting accelerator and water-reducing agent.¹

It is recommended for use as a dentin substitute under resin composite restorations and an endodontic repair material because of its good sealing ability, high compressive strengths, short setting time (10 minutes), biocompatibility, bioactivity, and biomineralization.
Tissue adhesives, such as cyanoacrylates, have been used in dentistry and in medicine because of their adhesive potential to the human tissue, even in the presence of moisture, their biological compatibility, surface isolation, hemostatic properties and bacteriostatic features. In endodontics, Cyanoacrylate has been used to seal the remaining dentin of endodontically treated teeth as it was found to control micro-leakage of oral fluid at the tooth / filling interface.

No studies have been documented to evaluate the sealing ability of biodentine with cyanoacrylate for perforation repair.

Materials and methods

SOURCE OF THE DATA

The study was conducted in the Department of Conservative Dentistry, A.B.Shetty Memorial Institute of Dental sciences on 20 extracted human mandibular molars collected from the Department of Oral and Maxillofacial surgery, A.B.Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangalore.

Method of collection of data

Selection of Teeth:

Inclusion Criteria: Intact Mandibular molars with minimal caries and restoration.

Exclusion criteria: Teeth with extensive caries

Procedure

Twenty extracted mandibular molar teeth were used.

The molars were amputated 3 mm below the furcation area by using a diamond disk followed by preparation of Endodontic access cavity.

A perforation was made between the orifices to the furcation area by using a high speed long shank carbide round bur (2 mm in diameter).

Every molar were then covered completely including cavity walls and pulpal floor with two successive layers of varnish.

Study design:

20 extracted mandibular molars with 5 molars in each group

Groups divided as follows

Group 1: Biodentine (bioactive dentin substitute)

Group 2: Cyanoacrylate and biodentine (bioactive dentin substitute)

Group 3: Positive control (Unsealed molars)

Group 4: Negative control (Non perforated molars)

Experimental groups: Group 1 and Group 2

Furcation perforation sealed with biodentine (bioactive dentin substitute)

Furcation perforation sealed with biodentine, cyanoacrylate

Control groups: Group 3 and Group 4

EVALUATION OF EXPERIMENTAL GROUPS

To avoid dye penetration through other areas, all experimental teeth were coated homogeneously with two coats of varnish for 1 to 2mm around the perforation.

After 24 hours of drying, all teeth were immersed in at 2% methylene blue solution for 48 hours.

After removal from the dye, the teeth were rinsed with water and dried at room temperature for 24 hours.

The teeth were placed in vials containing 1ml of concentrated (65 wt%) nitric acid until complete dissolution.

Vials were centrifuged at 9000 rpm for 7 minutes.

Two hundred microliters of the supernatant from each sample was transferred to a 96 well plate.

Sample absorbance were read by an automatic spectrophotometer at 550 nm using concentrated nitric acid as a blank.

SAMPLE ANALYSIS

ANOVA test was used to compare the mean of the different groups. Post hoc Tukey’s test was used in the procedure of pair-wise comparisons between the group when ANOVA test is significant. The level of significance were set at p value < 0.05. Statistical analysis was
performed with SPSS 16.0 software (Statistical Package for Scientific Studies).

**FINDINGS**

**TABLE1:** Sample absorbance values obtained from each sample measured using a spectrophotometer at 550nm.

<table>
<thead>
<tr>
<th>Biodentine</th>
<th>Biodentine with cyanocrylate</th>
<th>Positive control</th>
<th>Negative control</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.138</td>
<td>0.081</td>
<td>0.314</td>
<td>0.024</td>
</tr>
<tr>
<td>0.092</td>
<td>0.039</td>
<td>0.412</td>
<td>0.040</td>
</tr>
<tr>
<td>0.076</td>
<td>0.044</td>
<td><strong>0.98</strong></td>
<td>0.032</td>
</tr>
<tr>
<td>0.112</td>
<td><strong>0.033</strong></td>
<td>0.518</td>
<td>0.016</td>
</tr>
<tr>
<td>0.082</td>
<td>0.062</td>
<td>0.756</td>
<td>0.010</td>
</tr>
</tbody>
</table>

Table 2: Oneway ANOVA Test depicting the mean, standard deviation and ANOVA results of the various groups

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>No. of samples</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioactive dentine substitute</td>
<td>5</td>
<td>0.1000</td>
<td>0.025259</td>
<td></td>
</tr>
<tr>
<td>Bioactive dentine substitute and cyanocrylate</td>
<td>5</td>
<td><strong>0.05180</strong></td>
<td>0.019588</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Positive control</td>
<td>5</td>
<td><strong>0.59600</strong></td>
<td>0.270426</td>
<td></td>
</tr>
<tr>
<td>Negative control</td>
<td>5</td>
<td>0.02440</td>
<td>0.012033</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>0.19305</td>
<td>0.270895</td>
<td></td>
</tr>
</tbody>
</table>

- According to the results the positive control showed the highest mean absorbance (0.596) i.e. maximum dye leakage/dye extraction.
- Bioactive dentine substitute (0.1) showed next mean dye absorbance value.
- Bioactive dentine substitute with Cyanoacrylate (0.051) showed lesser dye absorbance i.e. lesser dye leakage/dye extraction than biodentine.

- The ANOVA test depicted overall significant differences between the groups in dye absorbance so a Post Hoc TUKEY test for pair wise comparison between the mean of the groups was performed.

Table 3: Post Hoc Tests depicting pair wise comparison between the groups

<table>
<thead>
<tr>
<th>(I) grp</th>
<th>(J) grp</th>
<th>Mean Difference (I-J)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioactive dentine substitute</td>
<td>Bioactive dentine substitute and cyanocrylate</td>
<td>0.048200</td>
<td>.943</td>
</tr>
<tr>
<td>Positive control</td>
<td>Bioactive dentine substitute</td>
<td>-.49600</td>
<td>.001</td>
</tr>
<tr>
<td>Negative control</td>
<td>Bioactive dentine substitute and cyanocrylate</td>
<td>-.048200</td>
<td>.943</td>
</tr>
<tr>
<td>Bioactive dentine substitute and cyanocrylate</td>
<td>Positive group</td>
<td>-.544200*</td>
<td>.001</td>
</tr>
<tr>
<td>Bioactive dentine substitute</td>
<td>Negative control</td>
<td>0.075600</td>
<td>.817</td>
</tr>
<tr>
<td>Bioactive dentine substitute and cyanocrylate</td>
<td>Negative control</td>
<td>-.027400</td>
<td>.988</td>
</tr>
<tr>
<td>Positive control</td>
<td>Bioactive dentine substitute</td>
<td>.496000*</td>
<td>.001</td>
</tr>
<tr>
<td>Bioactive dentine substitute and cyanocrylate</td>
<td>Positive group</td>
<td>-.544200*</td>
<td>.001</td>
</tr>
<tr>
<td>Negative control</td>
<td>Bioactive dentine substitute</td>
<td>0.571600</td>
<td>.001</td>
</tr>
<tr>
<td>Bioactive dentine substitute and cyanocrylate</td>
<td>Negative control</td>
<td>-.027400</td>
<td>.988</td>
</tr>
<tr>
<td>Positive group</td>
<td>Bioactive dentine substitute</td>
<td>-.571600*</td>
<td>.001</td>
</tr>
</tbody>
</table>

- Amongst all the groups Bioactive dentine substitute alone, Bioactive dentine substitute with cyanoacrylate had significantly lesser absorbance than positive control. (p<0.05)
• Positive control group (0.596) showed highly significant difference with Bioactive dentine substitute and Bioactive dentine substitute with cyanoacrylate.

• The mean difference is significant at the 0.05 level.

Graph 1: BAR DIAGRAM REPRESENTING THE SAMPLE ABSORBANCE (DYE EXTRACTION) OF THE VARIOUS MATERIALS USED

• The important factors that are considered in sealing furcation perforations are sealing ability of the repair materials and their extrusion into furcation areas. In this study, perforation sealing ability of Bioactive dentine substitute and Bioactive dentine substitute with CYANOACRYLATE was evaluated.

• This study uses the dye extraction method by Camp and Pashley (2003) to study the sealing ability of the materials. This method is a more reliable technique than dye penetration as it considers all the dye absorbed by the samples used.  

• A study comparing the efficacy of dye penetration to dye extraction method concluded that, dye extraction method may be preferred because of its simplified procedure and its ability to simulate oral conditions.  

• A spectrophotometer reader is used here to measure the fraction of incident light transmitted through a solution.  

• It can be used to determine concentration of compounds in solutions because concentration of the absorbing compound can be determined by the amount of light absorbed by the sample as it is directly proportional to it.  

• In this study negative control, showed lowest dye absorbance (0.024) and had absorbance values were near blank HN03 (0) and positive controls had the highest dye absorbance (0.596).

• In this study results showed that sample absorbance of the bioactive dentine substitute was more than that of bioactive dentine substitute with cyanoacrylate, which suggest better sealing ability of bioactive dentine substitute with cyanoacrylate as a repair material in furcal perforations.

• CYANOACRYLATE alone was not used in the study because of the chances of the adhesive seepage due to the greater flow of the material whereas is was used in combination with bioactive dentine substitute to enhance the seal of the furcal perforation region since its acts as a water proof dressing.

• Further studies are required before bioactive dentine substitute (Biodentine) with cyanoacrylate could be used a furcal repair material in clinical use.

CONCLUSION

• From this present study we could infer that the sample absorbance of BIODENTINE alone was more than that of BIODENTINE WITH CYANOACRYLATE.

• Statistically sealability of BIODENTINE and BIODENTINE WITH CYANOACRYLATE had a significant difference suggesting that the

• BIODENTINE WITH CYANOACRYLATE had a better sealing ability compared to BIODENTINE alone.

Conflict of Interest – Nil

Source of Funding- Self

Ethical Clearance – Not required

REFERENCES


Mental Health among High and Higher Secondary School Students

Nangaiyarkarasi S
Vels Institute of Science, Technology & Advanced Studies, Chennai

ABSTRACT

The objective of the present study was to examine the relationship between mental health and academic achievement among high and higher secondary students. The sample consists of 511 (boys 288 and girls 233) high and higher secondary students were randomly selected from Chennai and Kancheepuram district schools in Tamil Nadu. Correlation and independent t-test, ANOVA were used for analyzing the data. The result shows that there is significant difference between mental health and sample sub groups. More over the result reveals that the positive correlation between mental health and academic achievement of high and higher secondary students. Early detection for indications of mental health problems and understanding factors contributing to stress among students would promote better understanding of mental health in future.

Keywords: Mental health, Academic achievement

INTRODUCTION

Mental Health of the learner is very important for efficient learning and proper development of personality. Mental Health which today is recognized as an important aspect of one’s total health status is a basic factor that contributes to the maintenance of physical health as well as social effectiveness. Mental Health may be defined as the adjustment of the individuals to themselves and the world at large with a maximum of effectiveness, satisfaction, cheerfulness and socially considerate behavior and the ability of facing and accepting the realities of life, with minimum friction and tension. Hadfield (1952) defined “Mental Health is the full and harmonious functioning of the whole personality.”

According to statistics from the World Health Organization (2003b), 12% of global diseases (121 million people suffer from depression, 70 million from alcoholism, 24 million from schizophrenia and 37 experiences dementia) were a result of mental health problems. By 2020 as indicated by the World Health Organization (2003b) the burden will be increased by nearly 15%. This will result in the loss of disability-adjusted life-years to illness and young adults in developing countries seem to be the most prone. Hill and Wigfield (1984) states that test anxiety is one of the most important aspects of negative motivation and has direct debilitating effects on school performance. Students’ Academic, Behavioral, Cognitive, Affective factors also influenced their mental health. Students poor academic performance and inconsistent of attendance are leads to their mental health problems. (DeSocio & Hootman, 2004)

OBJECTIVES OF THE STUDY

To find out the impact of mental health of high and higher secondary school students.

To find out the influence of mental health on academic achievement of high and higher secondary school students.

HYPOTHESES

H.1) There is no significant difference between mental health of high and higher secondary students and the subgroup of the sample.

H.2.1 Sex
H.2.2 Parent education
H.2.3 Standard
H.2.4 Family income
H.2.5 Recreational activities
H.2.6 Study time
H.2). There is no significant relationship between mental health and academic achievement

  H.1.1 Behavior problem and conduct
  H.1.2 General positive affective
  H.1.3 Hyper active
  H.1.4 Emotional
  H.1.5 Pro social
  H.1.6 Depression
  H.1.7 Anxiety

**METHOD**

The sample consists of 511 high and higher secondary school students, of whom 288 were boys and 223 are girls from chennai and kancheepuram district school in Tamilnadu. Stratified random sampling technique used in the present study under this process, the entire universe or population is divided into a number of homogenous or types of classes. On the present study high and higher secondary students can be divided into number of sex (Boys, Girls) Parent Education (Non graduate, Graduate), Standard (High school level, Higher secondary level) Family Income (Above 12,000, Below 12,000), Recreational activities (Involved and Uninvolved), Study Times (Morning, Evening, Both).

**Instruments and Techniques applied**

**Mental health scale**

Mental health of individual was measured by mental health inventory which was developed by Veit & Ware (1983) in RAND Corporation. To measure the mental health among high and higher secondary students, the student form was prepared and which was consisted of 78 statements with four responses like always, often, sometimes and never. Mental health inventory (MHI) have are seven dimensions of mental health inventory are behavioral problem conduct , general positive affective, hyperactivity, emotional, pro social, depression, and anxiety are helpful to measure the student’s mental health status.

**Analysis**

Descriptive analysis was done using the statistical package SPSS to stratify the subgroups of the sample by the method of finding our averages, deviation and t test. Correlation was done in order to find out the relationship between Mental Health and Academic Achievement.

**Purpose and nature of the test**

This study intends to find out the level of mental health and the various psychological issues which the students are being faced and the influence of this issues may cause of their slow learning. Administration of the tool was conducted individually to ensure accuracy.

**ANALYTICAL DISCUSSION**

Table 1 and 2 represents the mean and standard deviation of the mental health scores based on the subgroups of the sample.

<table>
<thead>
<tr>
<th>Sub group</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>t- value</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>288</td>
<td>187.57</td>
<td>35.88</td>
<td>3.893</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td>Girls</td>
<td>223</td>
<td>199.31</td>
<td>31.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non graduate</td>
<td>280</td>
<td>186.48</td>
<td>34.75</td>
<td>4.560</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td>Graduate</td>
<td>231</td>
<td>200.22</td>
<td>32.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school level</td>
<td>257</td>
<td>195.82</td>
<td>30.56</td>
<td>2.070</td>
<td>0.14*</td>
</tr>
<tr>
<td>Higher secondary level</td>
<td>254</td>
<td>189.52</td>
<td>37.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above 12,000</td>
<td>253</td>
<td>189.56</td>
<td>36.50</td>
<td>2.037</td>
<td>0.04*</td>
</tr>
<tr>
<td>Below 12,000</td>
<td>258</td>
<td>195.76</td>
<td>32.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Involved</td>
<td>441</td>
<td>196.30</td>
<td>31.47</td>
<td>6.137</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td>Uninvolved</td>
<td>70</td>
<td>169.96</td>
<td>43.52</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note : *p<0.05, **p<0.01
Table 2: ANOVA for significant difference in Mental Health and its Factors among students with respect to Study Time

<table>
<thead>
<tr>
<th>Mental Health</th>
<th>Study Time</th>
<th>F value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Morning</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evening</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Both</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>184.71a</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(41.48)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>189.49a</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(30.96)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>198.51b</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(32.45)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The value within bracket refers to SD *p<0.05, **p<0.01

Different alphabet among Educational Qualifications denotes significant at 5% Level using Duncan Multiple Range Test (DMRT)

Table 1 represents the mean and standard deviation of the mental health scores based on the subgroups of the sample. There was a significant effect of sex $t = 3.893$, parent education $t = 4.560$, recreational activities $t = 6.137$ and $p = 0.001$. Since the $p$ value of mental health and its dimensions less than the 0.001. It reveals that there is significant difference between mental health and sample sub group. So hypothesis H.2 is rejected.

Moreover result indicated that in sex, girls mean score are high than boys. The above result with the respect to the gender is in concordance with the study done by Nanda, A.K. (2001), Female students had better mental health than male students and Peterson et al (1991) found that adolescent girls generally experienced more challenging and stressful events than boys. In parent education, graduate level parents’ children are having good mental health. Students who are involved in recreational activities, are having good mental health than uninvolved students. It further shows that significant effect at $p = 0.005$ level in students standard $t = 2.070$ and family income $t = 2.034$. It revealed that those who are studying high school level having good mental health than higher secondary level students and if the family income below 12,000/- those students having good mental health than other.

Table 2 emphasized that in DHRT analysis of $F = 7.18, p = 0.001$. So students study time also significant effect of their mental health. It reveals that the students those who are preferred to study both morning as well as evening, they have good mental health. The students spending the amount of time is correlated with their academic achievement (Gettinger & Walter, 2012). It may be observed from table 1 and 2 that there exists significant difference with almost all the chosen sub groups of the sample and hypothesis H.1 is rejected.

Table 3: Correlation between Mental health and Academic Achievement

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sub – variables</th>
<th>r-value</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health</td>
<td>Behaviour Problem and Conduct</td>
<td>0.401</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td></td>
<td>General Positive Affective</td>
<td>0.473</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td></td>
<td>Hyper Active</td>
<td>0.459</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td></td>
<td>Emotional</td>
<td>0.434</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td></td>
<td>Pro social</td>
<td>0.458</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>0.446</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td></td>
<td>Anxiety</td>
<td>0.476</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td></td>
<td>Overall Mental Health</td>
<td>0.549</td>
<td>&lt;0.01**</td>
</tr>
</tbody>
</table>

Note . *p<0.05, **p<0.01

Table 3 shows that the correlation value of Behaviour problem and conduct $r = 0.401$, general positive affective $r = 0.473$, hyper active $r = 0.459$, emotional $r = 0.434$, pro social $r = 0.458$, depression $r = 0.446$, anxiety $r = 0.476$ and over all mental health $r = 0.549$. Since the $p$ value of mental health and its dimensions less than the 0.001. It reveals that there is significant positive correlation between mental health and academic achievement. So the hypothesis H.2 is rejected at 1% level. If the students have good mental health, they can study well and their academic performance also good. This result corroborating with the study of Anita Chawla (2012) indicated that High academic achievement corresponds to high mental health and similar findings like maintaining emotional balance among students through a psychologist by using...
auto counselling increased their academic performance\textsuperscript{10} Panchanatham (1999). To be precise, The result of the above table reveal that mental health plays a vital role in determining the academic achievement of the high and higher secondary students.

**CONCLUSION AND SUGGESTIONS**

The study also reveals that there are gender difference in the level of mental health, Therefore, it understands that both boys and girls are having similar in their innate capacities, girls seems to process higher level of mental health. In the area of gender-role conflicted men has suggested that these men are not only more likely to experience psychological distress, but also less likely to use available services.\textsuperscript{11} Marks (2001) & Wood (1995)

It can perceived that the students those who are having the habit of studying at morning as well as evening, those students are higher mental health and involvement of recreational activities also helps to develop the good mental health.

The study clearly reflects that there is a positive relationship between mental health, and academic achievement among high and higher secondary level students. Students, who are having good mental health, are reflecting better in academic achievement also. Whereas poor mental health result is, poor in academic achievement.

**Ethical Clearance:** Not required

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**

8. Harrison, R. J., & Evans, W. S. (2017). School Mental Health Services for Adolescents, Retrieved from https://books.google.co.in
Gender Gap in Literate Life Expectancy – A District-Wise Study in India

Barnali Thakuria
Research Scholar, Department of Statistics, Gauhati University, Guwahati, Assam, India

ABSTRACT

Inadequate literacy describe as a strong barrier to access healthcare services. So, in the present study, the innovative indicator literate life expectancy (LLE) has been implemented to highlight the social differences existing in different parts of the country. Wolfgang Lutz (1995) was the first to develop LLE which gives an expected number of years a person lives in a literate state i.e., able to read and write under current mortality and literacy conditions. The obtained results showed that compared to men, women experienced less number of years in the literate state in almost all the districts of the selected states. It is believed that findings of the result in this study will help the policy makers and the government to focus more on literacy and programs relating to elementary education at the district level for the welfare and well being of the society.

Keywords: literate-life expectancy, education, gender-gap, India, district.

INTRODUCTION

Literacy is one of the important factors in the life of an individual. Lack of literacy directly affects the health of an individual, so the importance of education on physical health is fundamental. Inadequate literacy will also describe as a strong barrier to access healthcare services. So, in this perspective we tried to implement the literate life expectancy indicator to bring out the scenario of the people residing in different parts of the country. The concept of literate life expectancy (LLE) was first developed by Wolfgang Lutz in 1995 as an indicator of social development and quality of life. It is interpreted as an expected number of years a person lives in a literate state i.e., able to read and write under current mortality and literacy conditions. The indicator is innovative and simple which accounts only two essential elements of social development namely literacy and life expectancy. It is based on age-specific mortality rates and age-specific literate proportions and computed by means of life table method. The aim of this indicator is to look at person-years of life but in a literate state.

Lutz (1995) mentioned that this indicator has numerous advantages over other indicators of social and educational development like literacy rate by sex and age-standardized literacy rate. It is not an abstract index on a relative scale and can be expressed in terms of individual years of life. Moreover, LLE is the only social development indicator which can be projected into the future on the basis of other already accepted forecasts and thus illustrates both the path dependence and realistic prospects of development. This indicator does not reflect any measure of economic income rather it is based purely on individual characteristics like literacy and mortality. In addition to this, LLE can also be readily calculated for both the sexes separately that makes it very suitable for gender-specific analysis. It can also be evaluated for any subgroups of the population. The indicator not only shows the current level of social development but it also portrays the nation’s possibility for future development. LLE is an absolute number of social development which does not depend on any assumption.

Numerous studies in the literature showed that LLE has been widely used by various researchers for measuring the social development of a country which includes Khan and Asaduzzaman (2007) in Bangladesh, Medina (1996) in Mexico and Huang and Nanjo (1998) in China, Chattopadhyay (2010) in India. But the study on LLE at the district level is very limited. The LLE for females at the district level of India based on 2001 census data has been studied by Choudhury et.al (2013) for the first time in the literature. Since then no study has been undertaken at the district level of India.
with regards to LLE. The district is the basic territorial unit of administration in India and also the keystone of the whole administrative structure. It is believed that social development of any country is not possible if the equity conditions which are reflected at the micro level are not considered. So, the analysis of LLE at the micro level is essential to get a socio-development scenario in the administrative units. Out of 640 districts as per 2011 census of India, 190 districts from the selected states are included in the present analysis.

OBJECTIVE

With this backdrop, the objectives of the present study are:

1. To calculate the literate life expectancy (LLE) at the district level of some selected states representing various zones of India namely Assam from the North-East, Gujarat from the West, Kerala from the South, Rajasthan from the North, Uttar Pradesh from the Central and West Bengal from the East respectively for both the sexes based on 2011 census.

2. To assess the gender gap in terms of LLE at birth for the districts of the selected states mentioned above to capture the existing heterogeneity in the country.

DATA AND METHODOLOGY

The required data for the analysis are ordinary life tables and age-specific proportions of literate at the district level. The district-wise life tables for both the sexes have been constructed in a similar manner as the method developed by Choudhury and Sarma (2011)[8]. The one parameter model life tables for the major states and their corresponding districts were generated by Choudhury and Sarma (2011)[8] where the life expectancy at birth was the only input. As the life expectancy at birth at the district level is not readily available, so it has been estimated by the method of regression approach. Hence, the life tables at the sub-state level are constructed from the estimated expectation of life at birth. Secondly, information on literacy data was taken from the C8 table of the Census of India based on 2011 which is labelled by “Educational Level By Age and Sex Population Age 7 and above”. Data on literacy in the census table are structured in single, five and seven year age groups namely 0-6, 7, 8, ... 19, 20-24, 25-29,...,70-74, 75-79, 80+ by sex and place of residence. The age group 0-6 were divided into single year ages by applying Karup-King Interpolation formula. Then all the single year ages are converted into following year age groups viz.,0-1, 1-4, 5-9, 10-14, 15-19,…,60-65, 65-70, 70+ respectively. Also, the corresponding population data were obtained to calculate the literacy rate.

The LLE estimation follows the ordinary life table method which is used to compute mortality based life expectancy, with the only addition being that the number of person-years at each age is weighted by the age-specific proportion literate. If \( P_x \) is the age-specific proportions in age \( x \) then the literate person-years lived in the age \( x \) \( (L_x) \) is given by the following equation:

\[
L_x \times P_x = L_x
\]

where \( L_x \) denotes the total number of person-years living in age \( x \).

Then the LLE \( (L_x^0) \) is obtained by dividing the cumulative literate person-years \( (E_x) \) with the number of survivors \( (l_x) \) i.e.

\[
E_x^0 = \frac{E_x}{l_x}
\]

where \( E_x = \sum L_x \)

RESULTS AND DISCUSSION

The 2011 Census of India reports that the total literacy rate of the country stood at 74.04 %. Due to the limitation of the space, only the highest and lowest values of LLE at birth for the districts of the selected states are presented in the following table (Table 1). Table 2 displays the number and percentages of districts in each of the selected states having a literate life expectancy at birth below 20 years, 20-40 years, 40-60 years and above 60 years for both the sexes respectively. Table 3 presents the district-wise gender differential in LLE at birth.
Table 1: Maximum and minimum values of LLE at birth at the district level of Assam and Some of its Selected States for the period 2011.

<table>
<thead>
<tr>
<th>States</th>
<th>Number of Districts</th>
<th>Districts with (male)</th>
<th>Maximum LLE at birth</th>
<th>Minimum LLE at birth</th>
<th>Districts with (female)</th>
<th>Maximum LLE at birth</th>
<th>Minimum LLE at birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assam</td>
<td>27</td>
<td>Kamrup Metropolitan</td>
<td>49.80</td>
<td>Dhubri</td>
<td>Kamrup Metropolitan</td>
<td>49.62</td>
<td>Dhubri</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>26</td>
<td>Ahmedabad</td>
<td>51.55</td>
<td>Dohad</td>
<td>Navsari</td>
<td>46.61</td>
<td>Dohad</td>
</tr>
<tr>
<td>Kerala</td>
<td>14</td>
<td>Pathanamthitta</td>
<td>66.02</td>
<td>Wayanad</td>
<td>Pathanamthitta</td>
<td>69.78</td>
<td>Kasaragod</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>33</td>
<td>Jaipur</td>
<td>50.37</td>
<td>Banswara</td>
<td>Kota</td>
<td>37.16</td>
<td>Jalor</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>71</td>
<td>Gautam Buddha Nagar</td>
<td>47.40</td>
<td>Shrawasti</td>
<td>Kanpur Nagar</td>
<td>40.71</td>
<td>Shrawasti</td>
</tr>
<tr>
<td>West Bengal</td>
<td>19</td>
<td>Purba Medinipur</td>
<td>55.99</td>
<td>Uttar Dinajpur</td>
<td>Kolkata</td>
<td>47.55</td>
<td>Uttar Dinajpur</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>Pathanamthitta</td>
<td>66.02</td>
<td>Shrawasti</td>
<td>Pathanamthitta</td>
<td>69.78</td>
<td>Shrawasti</td>
</tr>
</tbody>
</table>

The above table (Table 1) depicts that out of the total of 27 districts of Assam, the highest LLE at birth for males prevailed in the Kamrup Metropolitan district with 49.80 years. This means that a person in this district on an average will survive for 49.80 years in a literate state. Lowest male LLE at birth prevails in the Dhubri district with 29.79 years. Similar districts also performed the highest and lowest score in case of females. The corresponding figures for LLE at birth ranges from 22.68 years (lowest) to 49.62 years (highest).

In Gujarat amongst the 26 districts, Ahmadabad occupied the highest position while Dohad stood the lowest position in terms of male LLE at birth with 51.55 years and 32.93 years respectively while in case of females, Dohad remains the lowest position with 19.61 years and Navsari district is the highest with 46.61 years. Among the 14 districts of Kerala, the highest male LLE at birth is indicated in the Pathanamthitta district with 66.02 years and lowest is recorded in the Wayanad district with 56.14 years. For females, Pathanamthitta district remained the highest position in 69.78 years while in Kasaragod district, females had only 52.43 years as the lowest value.

In Rajasthan out of 33 districts, Jaipur district registered the highest LLE at birth (50.37 years) among the males while lowest male LLE at birth is recorded in Banswara district with 29.06 years. Kota recorded the highest position (37.16) years in terms of female LLE at birth and the lowest is found in Jalor district with 15.83 years.

Among 70 districts of Uttar Pradesh, a higher value of LLE at birth is noticed in Gautam Buddha Nagar district and lowest is found in the Shrawasti district for males. The corresponding figures stood at 47.40 years and 26.58 years respectively. Highest female LLE at birth is found in Kanpur Nagar with 40.71 years and lowest is seen again in Shrawasti district with 12.85 years respectively. The situation of females in the Shrawasti
district in terms of literacy performed poorly as males are spending more than the double number of years in a literate state as compared to the female counterparts. Also for the same state, the value of LLE score varies widely within the districts amongst the females as the highest figure for female LLE at birth is more than three times the lowest figure of female LLE at birth. Possibly due to economic backwardness and enlightenment towards education are the major causes of the very low level of female literacy in this district[9].

Finally, out of a total of 19 districts of West Bengal, the highest male LLE at birth is found in the Purba Medinipur district with 55.99 years and Uttar Dinajpur district stood the lowest position in terms of LLE at birth (34.68 years). In case of females, LLE at birth is highest in Kolkata district with 47.55 years and lowest is seen in Uttar Dinajpur with 23.75 years. The district Uttar Dinajpur is characterized by low-health care and livelihood access and widespread rural poverty. This district is a largely agricultural district, rapid population escalation restricts the absorption of the new rural workforce into farm-based employment, while the low level of urbanization restrains the growth of the non-farm sector[10]. These are the reasons that had made the level of literacy not up to the mark as compared to other districts. The table reveals that the people of the backward districts are having less years of education in comparison to the people of the advanced districts. Possibly people of the backward districts are unaware about the value of education and the government schemes that were related to literacy. It is also noticed from the Table 1 that the level of education among the districts of Uttar Pradesh is very poor for both the sexes. One interesting feature which is found that the female LLE at birth in the Pathanamthitta district has surpassed the male LLE by 3.76 points.

Table 2: Difference between male and female LLE at birth among the districts of the selected states.

<table>
<thead>
<tr>
<th>States</th>
<th>Number of districts</th>
<th>Highest Difference</th>
<th>Lowest Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assam</td>
<td>27</td>
<td>Dhemaji (11.09)</td>
<td>Kamrup Metropolitan (0.18)</td>
</tr>
<tr>
<td>Gujarat</td>
<td>26</td>
<td>Banas Kantha (14.11)</td>
<td>Navsari (1.16)</td>
</tr>
</tbody>
</table>

The existence of gender gap is also reflected in the above table (Table 2). In Assam, the highest male-female difference in terms of LLE at birth is found in Dhemaji with 11.09 years while the lowest is seen in Kamrup Metropolitan with 0.18 years. Amongst the 26 districts of Gujarat, the highest gender differential in terms of LLE at birth occurred in Banas Kantha district with 14.11 years and the lowest is reflected in Navsari by 1.16 years. In Kerala, the highest male-female difference with regards to LLE at birth is found in Kasaragod with 5.41 years and the lowest is observed in Ernakulam with 0.05 years. In Rajasthan, the male-female gap in association to LLE at birth is noticed in Karauli (20.44 years) and the lowest prevailed in Ganganagar with 10.56 years. Similarly, out of 71 districts in Uttar Pradesh, the gender gap in terms of LLE at birth ranges from 3.89 years to 17.62 years. Finally, in West Bengal among the 19 districts, the highest gender difference in terms of LLE at birth is seen in Puruliya district with 18.46 years and the lowest revealed in Kolkata with 3.69 years. The possible reason for the huge gender discrimination might be due to the fact that school dropout rate among the girls is the highest since due to poverty in some families where parents cannot afford to send all the children to school, boys get the opportunity to attend the school as they give more priority to educate the boys.

CONCLUSION

The innovative indicator LLE has been implemented to highlight the social differences existing in different parts of the country. Compared to men, women experienced less number of years in the literate state in almost all the districts of the selected states. It is
believed that findings of the result in the present paper will help the policy makers and the government to focus more on literacy and programs relating to elementary education at the district level for the welfare and well-being of the society. Attention should be highly focused on increasing the educational level, particularly among the females as literacy is the crucial parameter for the empowerment of women in the society.

**Ethical Clearance:** Not applicable as the paper is based on secondary data from the published source.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**


Evaluation of a Community Orientation Program for First Year Medical Undergraduate Students

Suvetha Kannappan¹, Subhashini Ganesan², Sivan YS¹, Darshan Manoj³
¹Associate Professor, ²Assistant Professor, ³P G, Department of Community Medicine, PSG Institute of Medical Sciences & Research, Peelamedu, Coimbatore

ABSTRACT

Background: Against the backdrop of the new changes effected in the curriculum by the affiliating university a short-term community orientation programme was designed for the medical undergraduate (MBBS) students. This study aims at evaluating the one-week community orientation program based on students’ feedback, their performance in the assessment test and to understand the correlation between feedback evaluation scores and the student assessment scores.

Method: Feedback was obtained by an anonymized self-administered questionnaire which assessed their improvement in understanding through likert scale and understanding the factors which facilitated or hindered learning through open ended questions. Student assessment was conducted in the form a 20-item MCQ test. Spearman’s correlation was done to find out the association between program feedback scores and student assessment scores.

Results: 61.5% said that the program had greatly improved their understanding of the topics. Field visits (72.6%) and intra-session activities (71.6%) had helped in improving their understanding greatly and lecture mode of teaching (68%) was perceived by majority of students as a session that had slight or no change in the understanding of the subject. Students scored highest on topics that used activities in intra-session activities (95.3 %), field visits and group discussions (93.5% each) followed by role plays (91.6%).

Conclusion: Active teaching methods are greatly accepted by students and help them attain their learning objectives and feedback serves as an effective evaluation tool for assessing teaching programs.

Keywords: Community orientation, Curriculum, Evaluation, Medical education, Students

INTRODUCTION

Medical education is the basis on which high quality health care is built. So it becomes imperative to train medical students to become competent doctors of tomorrow. The medical curriculum should train doctors to respond to the health needs of the community.¹ Medical Schools shares responsibility for a comprehensive set of health services to a defined population in a given geographical area, consistent with values of quality, equity, relevance, and efficiency for developing and assessing innovative models integrating population and individual health activities, for learning and for conducting health research, and so it is important to orient the students to work as community physicians.²

The focus of medical education has changed from individual hospital centred to promotion of health of the community.³ The ROME program by WHO emphasised on community oriented medical education to produce doctors who are socially responsible and who possess the technical, scientific and management competence which
will enable them to play a useful role in the development of comprehensive health systems based on primary health care. A curriculum which gives consideration for and emphasises on community oriented teaching alone would help achieve the goal of developing primary care physicians. To keep up with the changing needs of the society the University to which this institute is affiliated has revised the Graduate medical curriculum.

Hence against the backdrop of the new changes effected in the curriculum by the affiliating university of our medical school, we designed a short-term community orientation programme for the medical undergraduate (MBBS) students under the aegis of the Department of Community Medicine of the medical school. It is also a well established fact that individuals have diverse learning styles and therefore for any teaching program to be successful different teaching strategies addressing the varying and diversified learning preferences of students have to be employed. By encouraging active learning in students, their performances also improves in examinations. Further, student feedback is an effective tool for evaluating the teaching-learning methods and contributing towards the success of the learning program. It gives rich information which helps to improve the program and teaching methods.

Thus keeping in mind the diverse learning preferences of the students and the short term and long term goals of the graduate medical curriculum a learning program was designed. This study aims at evaluating the one-week community orientation program based on students’ feedback, to assess the knowledge gained by students based on their performance in the assessment test and to understand the correlation between feedback evaluation scores and the student assessment scores.

**METHOD**

This is a cross sectional study using retrospective data obtained from feedback evaluation and assessment scores of community orientation program for 1st year undergraduate medical students. The week long program in community medicine is the first exposure for the students to the subject. A total of 150 students underwent the orientation program.

**Study setting:**

The Tamil Nadu Dr. M.G.R. Medical University (to which our medical school is affiliated) introduced a curriculum in community medicine for 1 year medical undergraduate (MBBS) students, according to which the students must have knowledge about:

- the evolution of community medicine
- definition of health and factors affecting it
- health care delivery system
- demographic pattern of the country
- the roles of the individual, family, community and socio-cultural milieu in health and disease
- social factors related to health
- disease and disability in the context of urban and rural societies
- the impact of urbanization on health and disease

Therefore a community orientation program was designed, which spread over 60 hours and focussed on the various objectives that the program had planned to attain. The program was also constructed in a way that it incorporated the various teaching styles addressing the diversified learning preferences of students. Table 1 shows the schedule planned for the one week orientation program comprising all the topics to be covered as per the new university curriculum.

**Table 1: The schedule designed for the orientation program based on areas stressed by the university curriculum**

<table>
<thead>
<tr>
<th>Session / Areas / Topics / Concepts</th>
<th>Program Objectives</th>
<th>Teaching / Learning Method</th>
<th>Duration (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to the Department of Community Medicine</td>
<td>To understand as to why they are posted to community medicine: its importance vis-a-vis community health</td>
<td>Lecture</td>
<td>60</td>
</tr>
<tr>
<td>History of public health, changing concepts of health</td>
<td>To understand the evolution of community medicine To define health and factors affecting it</td>
<td>Lectures using story line</td>
<td>60</td>
</tr>
</tbody>
</table>
### Table 1: The schedule designed for the orientation program based on areas stressed by the university curriculum

<table>
<thead>
<tr>
<th>Area</th>
<th>Activity Description</th>
<th>Teaching Method</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles of Primary Health Care</td>
<td>Enunciate the principles and elements of primary health care</td>
<td>Interactive lecture, Question &amp; Answer sessions</td>
<td>60</td>
</tr>
<tr>
<td>Health Care Delivery System (Principles, Services available and utilization of health care services)</td>
<td>Describe the health care delivery system</td>
<td>Interactive lecture, Question &amp; Answer sessions</td>
<td>60</td>
</tr>
<tr>
<td>Group work &amp; Discussion: Health Care Delivery System: PHC</td>
<td>Describe the organization and functions of the health care team at Primary Health Centre, Community Health Centre and District levels.</td>
<td>Lecture Group work &amp; Discussion Pre-visit briefing Visit to health centres/ hospital</td>
<td>120 for group discussion</td>
</tr>
<tr>
<td>Demographic trends, cycle</td>
<td>Understand the demographic pattern of the country and fertility</td>
<td>Lecture</td>
<td>60</td>
</tr>
<tr>
<td>Fertility and factors affecting it</td>
<td></td>
<td>Interactive lectures</td>
<td>60</td>
</tr>
<tr>
<td>Family welfare and population control</td>
<td></td>
<td>Interactive lectures</td>
<td>60</td>
</tr>
<tr>
<td>Hospital sociology, doctor patient relationship, ethics</td>
<td>The principles of practice of medicine in hospital and community Setting including medical ethics</td>
<td>Role play</td>
<td>120</td>
</tr>
<tr>
<td>Social factors influencing health-Socioeconomic status, cultural factors</td>
<td>Social determinants of health, disease and disability in the context of urban and rural societies</td>
<td>Lecture, Question &amp; Answer session, MCQs</td>
<td>60</td>
</tr>
<tr>
<td>Urbanization and its impact on health</td>
<td>Appreciate the impact of urbanization on health and disease</td>
<td>Lecture</td>
<td>60</td>
</tr>
<tr>
<td>Beyond hospital- reaching out to the community</td>
<td>Understand the principles of practice of medicine in hospital and community Setting including Medical ethics Develop rapport with the community using various participatory tools</td>
<td>Interactive lectures</td>
<td>60</td>
</tr>
<tr>
<td>Health communication</td>
<td>Describe the principles and practice of health education and to apply appropriate communication skills to bring about behavioural change in the community.</td>
<td>Intra session activities</td>
<td>90</td>
</tr>
<tr>
<td>Field visit and Presentations on visit to the Community</td>
<td>Observe and interpret the dynamics of community behaviour</td>
<td>Health education in the field by students</td>
<td>240</td>
</tr>
</tbody>
</table>

The orientation program incorporated various teaching methods to address the diverse needs of students. Some of the sessions had lecture classes. Story lines comprising the various historic changes in the public health field were used to teach the changing concepts of public health. Interactive lectures comprised of theory lectures and question and answer sessions in between and using probe questions to elicit answers of already known facts from students. Small group discussions were done before field visits on the various levels of health care to ensure that they had sufficient knowledge of the services available, thus enabling them to have a better understanding of the different health care systems during the visits. Through role play students were able to understand doctor patient relationship and medical ethics. Intra session activities...
included giving students an information and asking them to communicate among their peers involving different methods of communication and encouraging them to come out with the challenges and barriers they had come across in doing the activity.

Students conducted supervised health education sessions in the community using various audio-visual aids like flip charts and posters.

Student’s feedback and assessment was done at the end of the posting. Feedback was obtained using self-administered questionnaire which assessed their understanding of the subject using likert scale (greatly improved, slightly improved, no change) and understanding the factors which facilitated or hindered learning using open ended questions. Student assessment was conducted by administering a 20-item MCQ test which was aligned with the objectives.

The data are presented as frequencies and proportions. Spearman’s correlation was done to find out the association between program feedback scores and student assessment scores.

106 students (includes males and females) who completed the feedback and the assessment test were included in the study. Sampling method was universe.

RESULTS

Of the total 150 students, 106 students completed program evaluation questionnaire.

Table 2: Teaching techniques used and the understanding of the sessions based on student’s feedback

<table>
<thead>
<tr>
<th>Teaching-learning methods</th>
<th>Understanding about the topic/concept (n=106)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Improved greatly (%)</td>
<td>Improved Slightly (%)</td>
<td>No change (%)</td>
<td></td>
</tr>
<tr>
<td>1 Field Visits</td>
<td>79.3</td>
<td>19.5</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>2 Intra-session activities</td>
<td>73.7</td>
<td>24.4</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>3 Student Presentations</td>
<td>66.4</td>
<td>31.7</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>4 Used story line</td>
<td>61.9</td>
<td>32.4</td>
<td>5.7</td>
<td></td>
</tr>
<tr>
<td>5 Role plays</td>
<td>60.6</td>
<td>35.6</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>6 Group discussions</td>
<td>63.9</td>
<td>30.9</td>
<td>5.2</td>
<td></td>
</tr>
<tr>
<td>7 Interactive lectures</td>
<td>56.6</td>
<td>36.8</td>
<td>6.6</td>
<td></td>
</tr>
<tr>
<td>8 Lectures</td>
<td>32.1</td>
<td>50</td>
<td>17.9</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows that 61.5% of students said that the program had greatly improved their understanding of the topics; 32.8% said that their understanding improved slightly and 5.7% said that the program made no change in their understanding of the subject.

Individual sessions feedback was analyzed based on the mode of teaching-learning used. The result showed that field visits (79.3%) and intra-session activities (73.7%) had helped in improving their understanding greatly and lecture mode of teaching (68%) was perceived by majority of students as a session that had slight or no change in the understanding of the subject.

Table 3 shows that based on the assessment students scored highest on topics that used activities in intra-session activities (95.3%), field visits and group discussions (93.5% each) followed by role plays (91.6%).
Table 3: Shows the comparison between student’s feedback and the Assessment scores obtained (n=106)

<table>
<thead>
<tr>
<th>Teaching-learning methods</th>
<th>Improved greatly (% of students who responded that their knowledge improved greatly)</th>
<th>Assessment scores (% of students who gave correct answer)</th>
<th>Correlation between Program evaluation and Assessment Score (significance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Field Visits</td>
<td>79.3</td>
<td>93.5</td>
<td>0.778*</td>
</tr>
<tr>
<td>2 Intra-session activities</td>
<td>73.7</td>
<td>95.3</td>
<td></td>
</tr>
<tr>
<td>3 Student Presentations</td>
<td>66.4</td>
<td>77.6</td>
<td></td>
</tr>
<tr>
<td>4 Used story line</td>
<td>61.9</td>
<td>86.0</td>
<td></td>
</tr>
<tr>
<td>5 Role plays</td>
<td>60.6</td>
<td>91.6</td>
<td></td>
</tr>
<tr>
<td>6 Group discussions</td>
<td>63.9</td>
<td>93.5</td>
<td></td>
</tr>
<tr>
<td>7 Interactive lectures</td>
<td>56.6</td>
<td>75.7</td>
<td></td>
</tr>
<tr>
<td>8 Lectures</td>
<td>32.1</td>
<td>49.5</td>
<td></td>
</tr>
</tbody>
</table>

* - significant (p<0.05)

There was a significant correlation (r=0.778) between the student’s feedback and assessment scores as shown in table.3

Table 4: Leading factors that were mentioned in feedback regarding facilitating and hindering factors of the orientation program

<table>
<thead>
<tr>
<th>Facilitating</th>
<th>Hindering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field visits</td>
<td>Lecture classes</td>
</tr>
<tr>
<td>Interaction with the community</td>
<td>Lengthy duration of theory classes</td>
</tr>
<tr>
<td>Teaching with videos</td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

Our study shows that based on student feedback, active forms of learning like field visits which provided opportunities for experiential learning, intra-session activities and student’s presentation had greatly improved students understanding of the concepts. It also showed that lectures had played a minimal role in improving their understanding of the subject. This shows that students prefer to be active in their learning process. Active learning processes are desirable for many students as it helps them attain the learning outcomes. Studies among undergraduate medical students have showed that interactive teaching styles are more popular than didactic lectures; and that the least preferred teaching method was didactic lectures. Our study results are in agreement with the findings from these studies.

Our study also showed that teaching techniques rated as ‘greatly improved’ their understanding based on student’s feedback had also scored well in the assessment test. But techniques which were rated as ‘not greatly improved’ their understanding based on student’s feedback had actually scored high in the assessment test scores. Role play and group discussions which were rated by 40% of the students as ‘not improved’ their understanding greatly had actually resulted in more than 90% of them scoring well in those topics. A probable explanation would be that the task of preparing for class outside class hours and stage fear as mentioned by students in the feedback would have given a subjective feeling of rating them as not so good an option but had actually led to improvement in knowledge.

Similar studies have shown that techniques which involve greater effort from the student’s side had led to attainment of learning objectives. However for these methods students lack the enthusiasm because of the comfort from lectures. Also studies show that when student’s presentation or participation is there, the anxiety is more among students. So these would have been probable causes for students not giving a very positive feedback on methods like role-play but had actually made them attain their learning objectives.

Our study also showed that feedback on ‘factors that facilitated their learning’, most of the students have
quoted that field visits greatly improved their learning, and factors like lectures and long theory sessions have hindered their learning process.

The study also shows a significant positive correlation between student’s feedback and the assessment scores. This brought out the fact that student’s feedback is not only an effective evaluation tool to assess the teaching program; if properly designed it can be used effectively as an assessment test for evaluating student’s understanding of the subject.

Overall, the findings of this study suggest that for community orientation program in undergraduates, active teaching methods or opportunities for active learning are greatly accepted by students and had helped them attain their learning objectives. Students learn best by field visits, and activities in between theory sessions have helped students be active in their learning process. It also reiterates the fact that anonymized student’s feedback is an effective way of evaluating teaching sessions.

Though role plays and group discussions have not been perceived by students to improve their understanding it actually had resulted in attaining their learning objectives. Lack of enthusiasm and additional efforts needed from students could be a reason; further research is needed to understand why students haven’t perceived those methods to improve their understanding though it actually had.

Our study used student’s feedback which was subjective and the feedback though anonymous was collected by the department faculty which could have influenced the results.

**Conflict of Interest Disclosure:** The authors state that they have no conflict of interest to declare.

**Funding Disclosure:** No funding; self-funded study

**Ethical Clearance:** Ethical clearance was obtained from Institutional Human Ethics Committee (IHEC) at PSGIMSR

**REFERENCES**


An Economic Analysis of Small Scale Industries in Pudukkottai District (Tamil Nadu)

S Sureshand, S Jasirani1
1Associate Professor in Economics, Department of Economics, Vels University, Chennai

ABSTRACT

The important role-played by Small Scale Enterprises in promoting the economic development of India in recent decades especially in providing more jobs for rural people and bringing about a more equitable distribution of national income has been well recognized. While the majority of small enterprises depend on retained profit and informal source of credit for expansion, with growth in size, the need increases rapidly for external finance for working and fixed capital. In recent years, following the successful example of Japan, the Republic of Koria and India, in mobilizing and channeling finance to SSI, many schemes are experimented with a wide array of new financial institutions, instruments and innovations. The significant role that this sector plays in the development strategy of India’s economy is not only based on the fact of its being, labour-intensive and capital saving in character but also in 3 areas namely Production, Employment and Export.


INTRODUCTION

Generally a dry and hot climate prevails in the district (Pudukkottai District) which is not favorable for agricultural sector. So agricultural sector is inadequate to provide livelihood to the entire working force. On the other hand, the establishment of large-scale industries cannot solve the problem of seasonable unemployment found in India, which is solved by SSI sector only. Moreover the growth of capitalist enterprises and concentration of the means of production in few hands have led to the emergence of inequalities of income and wealth. So SSI units are ideal instruments for decentralization of industrial production is achieved especially in Pudukkottai District.

Pudukkottai District, formed in January 14, 1974 out of certain pockets of the then Trichy and Thanjavur Districts, has an area of 4663 Sqkm with a coastal line of 39 Kms. The District lies between 78.25 and 79.15 of the eastern longitude and between 9.50 and 10.40 of the northern latitude. It is bounded by Trichy District in the north and west, Sivagangai District in the south and Bay of Bengal in the east. Pudukkottai District is economically, industrially and educationally a backward district. Both the Central and State Government have declared it as an economically backward district. In order to promote the industrial scene in such backward areas both the Government of India and the Government of Tamil Nadu provide so many concessions and incentives to SSI units through District Industries Centre, which is located in Collector Office, Trichy Road.

OBJECTIVES OF THE STUDY

The potential role of small-scale industries in Pudukkottai District during the period 1995-2000 is examined here. The present study is an analytical and descriptive one, based on a survey of One Hundred Small Scale Industrial Entrepreneurs. One Hundred Entrepreneurs were selected out of (5441) Five Thousand Four Hundred and Forty One units on the basis of random method of sampling. A preliminary sketch of the growth of Small-Scale Industries in India and Tamil Nadu in general and Pudukkottai District in particular is presented. The SSI units Pudukkottai District have classified into three categories.

1. Agro-based processing units-Food, Rice Mill, Wood, Oil and Rubber, Coir Units (Total 30 units).
2. Industry-based production units-Gem Cutting,
Paper, Aluminium, Metal Products, Engineering Goods, Electrical Units (Total 40 Units)

3. Business based units – Beverages, Pan (Beeda), Xerox, Printing Press (Total 30 units), Gross Total 100.

Among the sample units selected at random, Industries manufacturing Aluminium, Paper, Plastic, Rubber, Chemical, Coir, Metal Products are found in large numbers in this study area of the One Hundred sample units, Fifty Two units are run by sole proprietorship and Forty Eight units are run by Partnership concerns. Sole Proprietorship is preferred more in Pudukkottai District.

(A) MAJOR OBJECTIVES

1. To find out the Capital Labour ratio of small-scale units.
2. To know the degree of capital output ratio of SSI units in Pudukkottai District.
3. To access the extent of capacity utilization of SSI units in the study region.
4. To analyses the structure and performance of small-scale industries.
5. To study the problems faced by various small-scale industrial units.
6. To identify the factors retarding the growth of small-scale industrial units in the study area and
7. To understand the sickness of Small Scale Industries in the study area.

HYPOTHESIS

The following hypotheses were formed.

1. The Credit given for the operations on development purpose is more useful than loans given on a general basis.
2. There is a relationship between the traditional background of the owners and entrepreneurs and the growth of small-scale industrial units.
3. The borrowings from commercial banks have paved the way for the growth of SSI units
4. The financial assistance to SSI from Central and State Government is inadequate.
5. The growth of productivity is positively associated with growth in input.
6. The manufacturing sector is not experiencing technological change.
7. The factor productivity and capital intensity are inter-related.

METHODOLOGY

Researchers collected both secondary 1990-95 period and primary 1995-2000 periods of data’s:

The primary data were collected through questionnaire from the entrepreneurs personally, particulars required to fulfill the objective of the study were asked in the questionnaire.

The District Industry Centre and the Commercial Banks gave the Secondary Data. For further informations, books, journals, magazines and other relevant material were referred too. The data collected from various sources were transcribed in to a master table to facilitate easy tabulation; percentages and ratios were worked out. Tools like the Granger test, Sims test and modified Sims test were also used to analyse the data.

The study covers the SSI Units registers with the District Industry Centre, Pudukkottai District during 1995-2000. Among the total units of 5441, 2290 SSI Units are sick and some are closed. The remaining 3150 units have been found to be healthy units and are efficiently operating during the period 1995-2000. Researchers had taken 100 units at random and have found that 42 units are sick in Pudukkottai District.

The researchers had also used secondary data through the Reports of Finance, Government of India, National Planning Commission, Reports of Ministry of Finance, State Planning Commission of Tamil Nadu, IOB Annual Credit Plan Reports, Articles of journals, Research papers. The published data of SIDCO, TIIC have been used and have been referred to.

CHAPTERISATION OF THE STUDY

The study is presented in seven chapters.

First chapter deals with introduction. In the Second chapter early studies are reviewed many studies on this subject undertaken by researchers have brought
to light, the innumerable difficulties that the Small-Scale entrepreneurs have had to face in running their enterprises in India.

The Third chapter deals with objectives, hypothesis, methodology and there is a discussion on the profile of the sample units in Pudukkottai District. Chapter Four discusses land factors for SSI. Chapter five deals with problems of SSI units and strategy for resolving such problems. In Sixth chapter, there is a discussion and proof with statistical models. In chapter Seven findings, suggestions and conclusion are presented.

The study shows how much capital invested in every SSI units, working capital, value of production, reason for low production, estimates of cost of production, number of workers employed in each SSI units, mode of employment of workers. Marketing conditions, they too are experiencing many constraints, such as shortage of working capital and raw material, poor infrastructure facilities and irregular power supply.

LIMITATIONS OF THE STUDY

1. The study does not cover the institutional assistance for sick units of SSI.

2. Further, this study does not cover the performance of some Central Government Institutions because of the scarcity of data.

3. Researchers could not receive Secondary Data sources from Pudukkottai Tamil Nadu Industry Investment Corporation Office directly; only data gathered through Annual Credit Plan Report published annually by IOB (Lead Bank) Pudukkottai District, is available.

4. The Researchers were not able to collect more as well as correct information from the respondents. Their ignorance and inexperience are stumbling blocks for the data collection.

5. The study is related to private SSI units only. No public sector units were considered in the process.

ANALYSIS OF THE CHAPTER.

The total population of the district as per 1991 census is Thirteen Lakhs, Twenty Seven Thousand and One Hundred Forty Eight (13, 27, 148) of which males and females are almost equally divided. The total population of the district as per 2001 census is 14, 52, 269 of which male’s population was 7, 20, 847. Female population was 7, 31, 422. According to 2001 census, Female population was more than Male population in Pudukkottai District.

The study is confirmed to Pudukkottai district, which is an industrially backward area in Tamil Nadu and it is now slowly developing into industrialized district of the state. This district has got 5441 registered SSI units (99-00), medium large-scale industries-34, Handicrafts units-2328 and Pudukkottai district is having 9 Taluks and 13 blocks. There is on SIPCOT industrial complex in the district 6km from head quarters with an area of 412 acres and 76 plots are available here which is located Trichy road, the extension of Cauvery water for the industrial units in the estate is planned.

The Tamil Nadu forest plantation corporation had also drawn up a detailed scheme for replacing the old fielding cashew plantations in the district with high yielding varieties. The TNFPC has brought over 1000 hectares of land eucalyptus and many of land under and many private farmers were also keen on taking up eucalyptus plantations. So that related industries could come up.

Out of the 18 institutions 3 banks have shown excellent performance by achieving 100/- target PNB-174% achievements, Bank of India 136% achievement, ICICI – 125% achievements.

REVIEW OF BANK PERFORMANCE -1995-2000

Target-144.29 Crores 93%
Achievements-134.83 Crores

Of the One hundred units selected for this study fifty three percent are located in Pudukkottai and seventeen percent in Mathur and Mandiyur nearby Trichy. Out of the one hundred SSI industries collected through random sampling method during the period of 1995-2000. Pudukkottai proper town having 53 units of SSI units Alangudi 6 units, Aranthangi 6 units, Ponamarravathy 1 unit, Mathur, Mandiyur 17 SSI units, Keeranur 5 units, Viralimalai 2 units, Kottaipatinam 2 units, Athanakootai 1 unit, Tirumayam 2 units, Kandarvakottai 1 unit, Annavasal 4 units. Total 100 units were collected by researchers through proper questionnaire.
The location of the majority of the sample units in Pudukkottai town and Mathur block must be attributed to the pioneering role played by these blocks in the Industrial Development of the District and the availability of infrastructural facilities in these two centers.

**RESULTSTHEORETICAL PROVED**

1. The credit given for specific operations on development purpose is more useful than loans given on general basis.

One of the striking findings of the present study is the fact that the Credit for specific operations is 95 of the entrepreneurs have taken to SSI as a since of profitability, less risk, prior experience, self employment, 5 units have been started with the only aim of profitability earned from SSI units. Earning more profit is more useful and it is specific operation than other purposes that is less risk, prior experience, and self employment as a general basis.

2. There is a relationship between the traditional backwardness and social background of the owners and the growth of SSI.

People in the age group between 40-60 are continuing (i.e.) 56 units in Pudukkottai District) the work of their ancestors professions. This hypothesis is proved. Backward Caste people have some political influence through which they are dominating SSI units and Scheduled Caste people did not shine in Small Scale Industrial units due to poverty, ignorance and the apathy shown by officials too. This hypothesis is also well proved.

3. The borrowing from commercial banks and the growth of SSI units.

In Pudukkottai District, commercial banks were established for improvement of SSI sectors particularly 72% of loans given to SSI units during the period of 1995-2000 by commercial banks, especially (IOB, SBI BANKS) had been well proved the financial strength of commercial banks than other sources of finances. This hypothesis is proved.

4. The State Government financial assistance to SSI units is very poor.

Only 8% of the loans were given to SSI units by the State Government. This hypothesis is also proved.

5. Statistical Proved

The growth of productivity is positively associated with growth in input. Emerging input like capital structure from this study according to SSI development in this district has also been worked out. It is presumed that greater the K/O ratio of output, the greater will be need for fixed capital and the sizes of output are highly correlated. For different industries in Pudukkottai District, it is that input that is investment and output are highly correlated. It is found that capital investment and output are highly correlated, as rank correlation is 0.70 where as capital investment and output at different levels are found 0.72. It means that at district level size of total capital employed plays important role for generation of income through value of output proceeds due to location choice of SSI units in Pudukkottai District.

6. The manufacturing sector is not experiencing technological change – it is proved.

- Capital productivity in PDKT District - 1.082%
- Capital Intensity - 3.296%
- Raw Material Productivity - 1%
- But Labour Productivity - 4.487% (per year)

7. Capital intensity and the factor productivity are inter-related

This hypothesis is disproved

Rs. 26,000/- will be required to employ one labourer annually in 1981. This ratio is higher than the other states. Rs. 18, 418 will be required to one labourer in other states in the same year. Recently between 1995 and 2000 O/K, ratios shows productivity of capital. It shows how much output is produced by a unit of capital. Sample units of PDKT District shows O/K ratio is 0.84 i.e. Rs. 84,000/- will be required to a unit of output which is higher than All India level ratio of 0.15 i.e. Rs. 15,000/- will be required to a unit of output or registered manufacturing sector.

**FINDINGS AND SUGGESTIONS**

1. Government Liberalization, Globalization, Privatization policies are not favorable to SSI Units in PDKT District.
2. TNEB levied heavy power rate for SSI, which is very heavy to bear.

3. Most of the units in SIPCOT complex are very sick due to low power supply mismanagement, lack of working capital, power shortage, and marketing problems.

4. Lakshmi Shanmuga Spinning Mill, Namana Samuthram which are located in Pudukkottai district is sick due to rise in raw material prices, heavy interest rates levied by banks according to Board of Industrial Financial Re-construction. Only remedy is government must take over all the important, SSI units with strict Government order.

5. Central exercise duty exemption should be granted to SSI and tiny sectors.

CONCLUSION

No doubt if the SSI meets challenges with determination, innovation and hard work they can even compete with foreign products also which are chapter even after levy of duties. The lowering of interest rates on their (SSI Units) borrowings to 5 or 6%, by a sympathetic attitude on the part of nationalized banks to those sick units in particular and by greater co-ordination among Government banks and other financial institutions and the entrepreneurs and the researchers portrays many invaluable ideas to develop the economically backward district.

Ethical Clearance: Yes

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

Role of Microfinance and Women Empowerment in Madurai District, Tamil Nadu

S Thangamayan¹, S Suresh², B Chithirairajan³

¹Assistant Professor; ²Associate Professor; ³Assistant Professor, Department of Economics, VISTAS

ABSTRACT

The key elements in empowerment are enabling and providing power and they reinforce each other. Women’s empowerment is a multifaceted concept that extends to the economic, social, cultural, political and psychological aspects of women’s life. The major objectives of the study are to study the socio economic impact of women SHGs on group members and to know the role of SHGs in providing rural credit. Total 50 women were interviewed. 10 SHGs were selected by simple random sampling method. As far as the selection of group members is concerned, five members were deliberately selected from each group. The study is purely descriptive. In order to achieve the objective of poverty eradication, every poor person should have easy access to credit for starting small economic activities based on local resources. However by 1970, the limitations and the critique of the welfare approach became obvious and resulted in the development of a number of alternative approaches based on equity, poverty alleviation, efficiency, and empowerment. Microfinance is not merely a financial business, but is a strategy or tool for empowerment of women particularly the poor. The microfinance concept when coordinated with the SHG lending system, those people who have been deprived of credit, could have their fair share of credit.

Keywords: Self Help Groups (SHGs), Micro Finance, Women Empowerment, Credit, Poverty Eradication, Economic development.

INTRODUCTION

The Concept of women empowerment is defined as the process by which women take control and ownership of their choices. The core elements of empowerment here have been defined as agency (the ability to define one’s goals and act upon them), awareness of gendered power structures, self-esteem and self-confidence. Empowerment can take place at a hierarchy of different levels individual, household, community and societal and it is facilitative by providing encouraging factors (e.g. lack of resources and skills). In this connection micro finance with self-help groups play an effective role for promoting women empowerment. Indian women have to be made as an integral part of the socio economic structure of the society. The social values, norms, which influence social expectations regarding the behavior of women, will determine a role and her position in society to a great extent in the process of changing era. Changes have been taken place in the position of Indian women as a part of the process of transformation of the traditional society. The situation of women actually has changed completely in the last thirty years. In the beginning of 1970s; women were behind in the field of development. There were no changes for the empowerment of women. In the Third World both rural and urban women were playing a significant role in the activities of managerial decision making. Self-help groups have been instrumental in the empowerment of women by enabling women to work together as a collective agency. Women command few economics resources and frequently rely on family or male members. However, self-help groups, when combined with savings and credit, have enabled women to benefit economically by monetizing their contribution and in the process have empowered them to become agents of change. Another related aspect is that self-help groups have facilitated the formation of social capital where people learn to work together for a common purpose in a group or organization. Women learn to work for a common purpose in a group or organization. They learn to work for a common purpose in self-help groups leading to the formation of social capital. Although women form nearly half of the human capital, they are still the most deprived and neglected segments of the
society despite the constitutional guarantee, and for
equal rights and privileges for men and women. Women
constitute to be the victims of a process of economic,
social, cultural and political marginalization. While a
large part of the world countries look at women's issues
in terms of paternalism and well-being, the concept
of women’s empowerment in the social, political, and
economic order as a pre-requisite of human development
is hardly given the priority that it deserves.

THE CONCEPT OF MICROFINANCE AND
SELF-HELP GROUPS

The concept of SHG which has been gaining
significance especially in area of micro-finance is mainly
the off-shoot of the success of group based approach
to savings and credit for the rural poor followed by
the Grameen Bank of Bangladesh. The group based
approach not only enables the poor to accumulate capital
by way of small savings but also, and more importantly,
helps them to have easy access to formal credit facilities.
These groups by way of joint liability enable the poor
to overcome the problem of collateral, which is a major
hurdle in gaining access to institutional credit. The joint
liability not only improves group member’s accessibility
to credit but also creates conditions or mechanisms
like peer monitoring, leading to better loan recoveries.
Formation of Self-Help Groups is the prime-mover as
well as integral part of microfinance based credit delivery
system and involves the following three basic steps:

• Group formation (formation, development and
  strengthening of the groups to evolve into self-
  managed people’s organizations at grassroots
  level);

• Capital formation through the Revolving Fund, skill
  development (management skills for management
  of their organizations as well the activity); and

• Taking up economic activity (micro-enterprises)
  for income generation.

Microfinance refers to the supply of loans, savings
and other basic financial services to the poor. It envisages
mobilizing thrift and supplementing it with loan from
the financial institutions. By providing access to
financial services, microfinance plays an important role
in the fight against the many aspects of poverty. Main
objectives of microfinance are:

1. Poverty alleviation
2. Empowerment of women
3. Financial sustainability
4. Increased outreach and impact

OBJECTIVES OF THE STUDY

1. To study the socio economic impact of women
   SHGs on group members.
2. To know the role of SHGs in providing rural credit.
3. To study on status and impact of Micro finance in
   India.

METHODOLOGY

The present study focused on Madurai District and
selected village in this District SHGs are functioning
in the very success manner. The primary data were
collected during the period January 2014 with the help
of interview schedule. The schedule included related to
general information about the SHGs members, socio
demographic profile, income, expenditure, savings
and loan schemes available to SHGs members.Total
50 women were interviewed. 10 SHGs of was selected
by simple random sampling method. As far as the
selection of group members is concerned, five members
were deliberately selected from each group. The study
is purely descriptive. The researcher has undertaken
every possible effort to fill up the gaps of information by
conducting individual interviews.

SOCIO ECONOMIC IMPACT OF SHGS

Women self-help groups have been proving their
significance in entrepreneurship development, marketing
and active participation in social welfare campaigns,
fighting against alcoholism, child marriages, dowry and
superstitions. Saving is the principal activity of self-
help groups. It was observed that after joining SHGs,
the women members had become habitual of savings
and depositing a certain amount regularly with their
respective groups.
Table 1: Monthly Savings, Loan Purpose and Credit Facility availed by Responds

<table>
<thead>
<tr>
<th>1) Monthly Savings</th>
<th>No. of the respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 25</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>26 – 50</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>51 – 100</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>101 – 250</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>151 and above</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2) Loan Purpose</th>
<th>No. of the Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business activity</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Household needs</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>Festivals</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>House construction and Repair</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Education</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Repayment of loan</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Other Purposes</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3) Loan Amount (in Rs.)</th>
<th>No. of the Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to Rs. 500</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>501 – 1000</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>1001 - 2500</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>2501 – 5000</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>5001 – 10000</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>10001 and above</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4) Loan Repayment</th>
<th>No. of the Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular</td>
<td>42</td>
<td>84</td>
</tr>
<tr>
<td>Irregular</td>
<td>8</td>
<td>16</td>
</tr>
</tbody>
</table>


As far as repayment of loan was concerned, 84 percent women members were regular at repayment of loan whereas 16 percent respondents were irregular. The major reasons of irregular repayment were use of loan amount for unproductive purpose, uncertain and inadequate income of the respondents.

The major aim of the SHGs is to promote savings and to credit for the productive purposes. This is true because many people in the study area join the SHGs for getting loan and promote their personal savings, in addition to get social status. The highest number of the respondents 30 percent had used loan amount for meeting household needs, such as, purchasing food grains, clothes etc. whereas repayment of loan was the main purpose in case of 6 percent women respondents.

**RURAL CREDIT AND SHGS**

One of the reasons for joining SHGs is to avail credit which is true in the present study area. The second objective of the present study is to know the rural credit by SHGs. The credit organizations like nationalized banks, Cooperative Societies and so on, follow many formalities to provide credit to the rural people. At the same time village money lenders change very high rate of interest. In this situation SHGs are the boon to the rural people, because instead of approaching banks individually, SHGs can easily approach the banks and other institutions to get loan. The SHGs get loan from credit institutions refinance (share) to the members in the SHGs. In the study the prevailing interest rate is 1 percent to 4 percent. Therefore members are repaid the loan in time.
Table 2: Types of Loans in the SHGs

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Types of the Loan</th>
<th>Maximum amount Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Business Loan</td>
<td>20000 to 25000</td>
</tr>
<tr>
<td>2</td>
<td>Marriage Loan</td>
<td>Up to 20000</td>
</tr>
<tr>
<td>3</td>
<td>Repay the old Loan</td>
<td>10000 to 15000</td>
</tr>
<tr>
<td>4</td>
<td>Medical Loan</td>
<td>10000 to 15000</td>
</tr>
<tr>
<td>5</td>
<td>House repairing Loan</td>
<td>Up to 5000</td>
</tr>
<tr>
<td>6</td>
<td>Cattle Loan</td>
<td>5000 to 7500</td>
</tr>
</tbody>
</table>


Most of the respondents are received business loan and repay the old loan. Cattle loan are received by agricultural labour and farmers. Marginalized people are received by house repairing loan in study area. All the SHGs are having a procedure to upper limit of loan. Table – 3 gives to maximum limit of loan amount in SHGs in study area.

Table 3: Amount of Loan Availed by the members through SHGs

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Amount of Loan</th>
<th>No. of respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Less than 5000</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>2</td>
<td>5000 to 10000</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>10000 – 15000</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>15000 – 20000</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>Above 20000</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>


Table 4: Repayment of Loan by SHGs members

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Amount of Loan</th>
<th>No. of respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Repayment in time</td>
<td>31</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>Repayment in advance</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>Repayment not in time</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>


Moreover banks instruct the members to save minimum Rs.200 per month. So repayment is very easy to SHGs. The loans can be used by individual group members for their personal needs, sometime the group may invest on any economic activities. Nowadays many SHGs are starting small business, cottage industries, food processing units etc. The SHGs in the study are granting the loan to their member for various purposes. The maximum loan amount per members is decided by the personal by the general body meeting (Table 4). Almost the all members in the study areas are availing the loan facilitates SHGs.

STATUS OF MICROFINANCE IN INDIA

The microfinance initiatives of NABARD yielded remarkable success and the SHG bank linkage programme has emerged as the largest microfinance programme in the world. The pilot project started in 1992 has turned into a national movement leading to the socio-economic empowerment of women.

Table No. 5: SHG – Bank Linkage Programme 2013-14 : Physical

(As on 31 March 2010)

<table>
<thead>
<tr>
<th></th>
<th>Total number of SHGs savings linked with banks</th>
<th>69.53 lakh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out of total, [of which]</td>
<td>exclusive Women SHGs</td>
<td>53.10 lakh</td>
</tr>
<tr>
<td>-SGSY SHGs</td>
<td></td>
<td>16.94 lakh</td>
</tr>
<tr>
<td>Total number of SHGs credit linked during 2009-10</td>
<td>15.87 lakh</td>
<td></td>
</tr>
<tr>
<td>Out of total [of which]</td>
<td>exclusive Women SHGs credit linked</td>
<td>12.94 lakh</td>
</tr>
<tr>
<td>-SGSY SHGs credit linked</td>
<td></td>
<td>2.67 lakh</td>
</tr>
<tr>
<td>Total number of SHGs having loans outstanding as on 31 March 2010</td>
<td>48.51 lakh</td>
<td></td>
</tr>
<tr>
<td>Of which exclusive Women SHGs</td>
<td></td>
<td>38.98 lakh</td>
</tr>
<tr>
<td>Of which-SGSY SHGs</td>
<td></td>
<td>12.45 lakh</td>
</tr>
<tr>
<td>Estimated number of families covered up to 31 March 2010</td>
<td>97 million</td>
<td></td>
</tr>
</tbody>
</table>
IMPACT OF MICROFINANCE

The micro-enterprises run by the SHG members through the microfinance provided improve their economic condition as follows:

- It enables the poor to take advantage of existing opportunities
- It builds up their assets
- It generates self-employment
- It develops micro enterprises
- It raises their income
- It builds up their self-confidence and self-esteem
- It enhances overall economic growth
- It enhances domestic savings and improves financial market
- It provides escape route from poverty

The benefits are not merely economic; they have also helped the women gain qualities of leadership; attain self-confidence, economic self-sufficiency, self-respect and concentrates on capacity building among women. The women undergo training programmes and discuss various issues that concern them and their village. They have become very articulate and enterprising. Microfinance will also give an access to support network thus enabling them to advance their individual and collective interests at local and macro level. Sustainable microfinance services lead to women’s individual economic empowerment by stimulating women’s micro-enterprise development and leading to increased income under women’s control. Women’s control over these resources will then lead to increased well-being (health, nutrition, literacy, and housing) and reduced mortality rates for women and their children. Microfinance has the effect of increasing the political empowerment of individuals in a society. Microfinance can primarily strengthen political empowerment through two mechanisms. First, if microfinance improves the economic and the social conditions of the poor, the poor’s political empowerment will consequently rise due to an increase in their self-efficacy. Second, in addition to increased self-efficacy, microfinance can also increase the social capital in a society, which then improves individual’s access to political information and capacity to participate in politics.

RECOMMENDATIONS OF THIS STUDY

The following recommendations are made on a pragmatic basis and with a view to provide a new baseline of action.

1. There is a need for providing social security schemes like provident fund, medical benefits, pension etc., to the members of SHGs.
2. The government, bank and educational institutions should regularly arrange training programmes for the SHGs members for improvement of their managerial and behavioral competency.
3. The banks should relax their terms and conditions while giving loans to the SHGs. Bank should not impose any minimum limit for the savings.
4. There is a need for enacting separate act to provide legal framework for the functioning of SHGs in the country.
5. Encouraging the media with the help SHGs organizations to project positive images of women and girl child, change the mind-set of the people and thus promote balanced portrayals of women and men.
6. The government department should make budgetary allocation for training components for the Self Help Group members.

CONCLUSION

Microfinance is not merely a financial business, but is a strategy or tool for empowerment of women particularly the poor. The microfinance concept when coordinated with the SHG lending system, those people who have been deprived of credit, could have their fair share of credit. Considering the vast number of poor, discriminated and underprivileged women and the need of financial services, there is tremendous scope for micro financing through SHGs in India. The NBFCs, Banks and Voluntary Organizations play a crucial role in the micro finance market. In order to achieve the objective of poverty eradication, every poor person should have easy access to credit for starting small economic activities based on local resources. Women self-help groups can play a very positive role in socio economic empowerment of poor women. Micro finance can play
a crucial role in achieving Millennium Development Goals and reducing world’s poverty by 50 percent by the end of 2015. Poverty reduction is possible by providing easy access to credit for small entrepreneurial activities. Empowerment of women can be promoted through socio economic activities at grass root level. Confidence build up by SHGs helps women members to fight against injustice and secure their rights.

Ethical Clearance - Completed

Sources of Funding - Self

Conflict of Interest - NIL

REFERENCES

Knowledge and Attitude Regarding Menstrual Blood Banking

Jomon C U¹, Laveena Anitha Barboza¹, Linu Sara George²

¹Lecturer, Manipal College of Nursing Manipal, Manipal Academy of Higher Education, Manipal, Udupi, Karnataka, ²Professor & Head, Department of Fundamentals of Nursing, Manipal College of Nursing Manipal, Manipal Academy of Higher Education, Manipal, Udupi, Karnataka

ABSTRACT

Introduction or Background: The menstrual blood is being discharged by the female every month considering it is useless. But researchers found out that it contains plenty of self-renewing stem cells. Stem cells are master cells that have the capability of turning into any sort of cell in the body. They are very proliferative and have the unique capacity to form into different sorts of healthy cells such as cells of blood, heart, bones, skin, muscles, and brain cells.

Objective of this study is to assess the knowledge and attitude of female health care professionals regarding menstrual blood banking.

Method and Material: The study was carried out in various departments of Manipal University, Manipal. Descriptive survey design was used. Using purposive sampling method 220 female health care professionals were selected for the study. Structured knowledge questionnaire and attitude scale was used for data collection. Descriptive statistics was used for analysis.

Findings: The study identified that 75 (34.1%) had poor, 116 (52.7%) had average and 29(13.2%) had good knowledge regarding menstrual blood banking among female health care professionals. The attitude of female health care professionals shows that 76 (34.5%) has favorable, and 144 (65.5%) has unfavorable attitude towards menstrual blood banking.

Conclusions: The study results shows that the majority of the subjects had unfavorable attitude. Hence incidental teaching was given to improve their knowledge and change their attitude and making known about the facts to the public remains challenging but the present research should show its possibility and gain its momentum.

Key-words: Menstrual Blood banking (MBB), female healthcare professionals, attitude, knowledge.

INTRODUCTION OR BACK GROUND

Menstruation is an episodic discharge of blood, tissue fluid, mucus, and epithelial cells that regularly last for five days; caused by a sudden reduction in estrogens and progesterone.¹ The menstrual blood is discharged by every woman considering it is an unhygienic waste. What was considered to be an unsanitary biological waste so far can now provide the client with a new lease of life. Now the new research has discovered that menstrual blood is a rich source of lifesaving stem cells.² This discovery has provided new meaning to women’s life who were earlier presuming menstruation as painful suffering.

Stem cells are principal cells that have the capability of turning into different types of cells in the body. One of the main features of stem cells is their ability to self-renew or proliferate while sustaining the potential to produce into other types of cells. Stem cells can turn

Corresponding author- Laveena Anitha Barboza
Lecturer, Manipal College of Nursing Manipal, Manipal Academy of Higher Education, Manipal, Udupi, Karnataka, Phone numbers: +919743856087
E-mail address: barboza.laveena@manipal.edu
into cells of the heart, blood, bones, muscles, skin and brain and so forth. There are diverse sources of stem cells, but all forms of stem cells have the equal ability to grow into several kinds of cells.  

Stem cells are acquired from two leading sources namely the embryonic stem cells and the adult stem cells. Embryonic stem cells are derived and isolated from the human embryos which are generally obtained from the leftover embryos of the in-vitro fertilisation treatments and the foetal tissues obtained from aborts. Generally, these cells are surrounded by the ethical concerns. Mature stem cells are acquired from the following; umbilical cord blood, bone marrow, peripheral blood stem cells, menstrual blood, skin, teeth, placental tissue, endometrium.  

Stem cells obtained from menstrual blood are extremely rich in Mesenchymal Stem Cells (MSCs). These stem cells have the potential to overcome the difficulty of immune rejection in female patients, as they could utilize their own stem cells for therapies, mainly these menstrual blood stem cells can be easily collected and processed in a non-invasive manner.  

Menstrual blood banking is a process of collection and storage of menstrual blood for the purpose of cell therapy. The procedure for collection of menstrual blood is painless and hassle free a silicone cup is introduced in the vagina on the day of maximum flow. The cup needs to be kept inside the vagina for three hours in order to collect nearly 30 milliliters of blood. This is then transferred in the collection kit and is sent back to the menstrual blood bank laboratory where it is processed, frozen and stored. This process is completely easy to the user because, it is absolutely free from pain and non-invasive. Also, any female can store stem cells for future even without waiting for childbirth.  

Hence menstrual blood banking was a new concept and very few research studies have been done, the researchers were interested to assess the knowledge and attitude of health care professionals on menstrual blood banking. The researcher also informed the female health care professionals that the stem cells derived from menstrual blood could be easily available and has no ethical issues for its use.  

MATERIAL AND METHOD  

The study adopted survey approach with descriptive survey design. The study consisted of 220 female health care professionals between the age group of 20 to 40 years were selected based on purposive sampling. Subjects were taken from various departments such as nursing, laboratories and teaching departments of Manipal University, Manipal and Mangalore campus. After reviewing the research and non-research literatures in the area related to menstrual blood banking, the research instruments were developed by the researchers to obtain adequate data for drawing conclusions pertinent to the study. The data collection instruments were: Tool I: Demographic Proforma, which was developed by the researcher to collect the background information of the female health care professional such as age, marital status, educational status, religion, working department, occupation, and years of experience in the profession.  

The tool II: Structured knowledge questionnaire regarding menstrual blood banking. The structured knowledge questionnaire consisted of 30 multiple choice items with one correct answer for each. The tool was validated by seven experts suggested to retain only 22 items. Pretesting was done among five participants and there was no difficulty to understand the test items. The knowledge scores were categorized as good (17-22), average (11-16) and poor (0-10). The reliability was established by split half method and found to be reliable (r=0.7).  

Tool III: Attitude towards menstrual blood banking. Attitude scale was developed by the investigators to find out the attitude of female health professionals towards menstrual blood banking. It consisted of twenty items with four point Likert scale ranging from strongly agree-4, agree- 3, disagree-2, and strongly disagree-1. The tool had positive as well as negative statements. The negative items in the tool were scored in reverse order. The total score was categorized as favorable (40-60) and
unfavorable (15-39) attitude. The content validity was obtained by submitting tool to seven experts. As per the suggestions 15 items were retained. Pretesting was done among five participants and there was no difficulty to understand the test items.

Cronbach’s alpha method was used to test reliability and the value was r=0.8. Pilot study was conducted among 10 (ten) female healthcare professionals from selected institution of Manipal University and the study was found to be feasible.

Permission was obtained from Deans of various institutions, medical superintendent of the selected Tertiary Care Hospitals, Ethical clearance from the Institutional Ethical Committee of the Selected Hospital; Informed consent was taken from the study participants. The data was collected from the participants by using the structured tools and computed.

**FINDINGS**

Statistical package of social science software (SPSS 16.0) was used for statistical analysis of data. Frequency, mean, percentage tests were applied.

**Sample Characteristics:**

The demographic data such as age, marital status, educational status, religion, working department, occupation, and years of experience in the profession was collected by using demographic proforma and the details are given in Table 1.

<table>
<thead>
<tr>
<th>Table 1: Sample Characteristics</th>
<th>n=220</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample characteristics</strong></td>
<td><strong>Frequency (f)</strong></td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
</tr>
<tr>
<td>20-30</td>
<td>157</td>
</tr>
<tr>
<td>31-40</td>
<td>63</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>132</td>
</tr>
<tr>
<td>Unmarried</td>
<td>88</td>
</tr>
<tr>
<td><strong>Educational status</strong></td>
<td></td>
</tr>
<tr>
<td>Doctorate</td>
<td>7</td>
</tr>
<tr>
<td>Graduate</td>
<td>80</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>23</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>110</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>102</td>
</tr>
<tr>
<td>Hindu</td>
<td>114</td>
</tr>
<tr>
<td>Muslim</td>
<td>4</td>
</tr>
<tr>
<td><strong>Working department</strong></td>
<td></td>
</tr>
<tr>
<td>Nursing</td>
<td>204</td>
</tr>
<tr>
<td>Lab</td>
<td>16</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
</tr>
<tr>
<td>Staff nurse</td>
<td>205</td>
</tr>
<tr>
<td>Lab technician</td>
<td>9</td>
</tr>
<tr>
<td>Teaching faculty</td>
<td>6</td>
</tr>
<tr>
<td><strong>Years of experience (years)</strong></td>
<td></td>
</tr>
<tr>
<td>0-5</td>
<td>131</td>
</tr>
<tr>
<td>6-10</td>
<td>43</td>
</tr>
<tr>
<td>11-15</td>
<td>18</td>
</tr>
<tr>
<td>16-20</td>
<td>28</td>
</tr>
</tbody>
</table>
The data presented in table I show that the majority of 157 (71.4%) of samples belongs to the age group of 20-30 years, 132 (60%) were married, 110 (50%) were undergraduates, 114 (51.8%) were Hindus, 204 (92.7%) from nursing and 131 (59.5%) had 0-5 years of working experience.

**Level of knowledge of female health care professionals regarding menstrual blood banking.**

The level of knowledge of female health care professionals regarding menstrual blood banking was assessed by administering structured knowledge questionnaire.

The knowledge scores were categorized as good, average and poor and is represented in figure 1.

![Figure 1. Pie diagram showing the percentage of knowledge scores on menstrual blood banking.](image)

The data presented in figure 1 depicts that 75 (34.1%) had poor, 116 (52.7%) had average and 29 (13.2%) had good knowledge regarding menstrual blood banking among female health care professionals of selected institutions.

**Description of level of attitude towards menstrual blood banking among female health care Professionals.**

The attitude scores towards menstrual blood banking among female health care professionals of selected institutions are categorized as favorable and unfavorable attitude. It is represented in figure 2.

![Figure 2: Bar diagram showing the attitude towards menstrual blood banking.](image)
The data presented in figure 2 depicts that 76 (34.5%) had favorable, and 144 (65.5%) had unfavorable attitude towards menstrual blood banking among female health care professionals of selected institutions.

**DISCUSSION**

The present study shows that, the majority of 157 (71.4%) samples belongs to the age group of 20-30 years, 132 (60%) were married, 110 (50%) were undergraduates, 114 (51.8%) were Hindus, 204 (92.7%) from nursing and 131 (59.5%) had 0-5 years of working experience.

The present study depicts that, among the 220 female health care professionals, 75 (34.1%) had poor, 116 (52.7%) had average and 29 (13.2%) had good knowledge regarding menstrual blood banking.

A similar study result on effectiveness of structured teaching programme among nursing students on knowledge regarding menstrual blood stem cell banking reports that 92.7% nursing students had average knowledge regarding menstrual blood stem cell banking in the pre -test and most (88.5%) of the nursing students had good knowledge in the post-test. While comparing, mean post-test knowledge score was more than pre-test knowledge score which was calculated by t-test (t=19.197) at p<0.05 level of significance.  

This study findings also supports the present study. A cross-sectional study was done among 97 nurses trained in midwifery and neonatology in a tertiary teaching hospital in Kelantan, Malaysia. Majority of the nurses (n=84; 86.6%) surveyed had a moderate knowledge about stem cells in medicine. More than half (n=59; 60.8%) of the nurses exhibited a positive attitude towards the therapeutic potential of stem cells in medicine. There was a statistically significant difference in total knowledge scores and nurses’ clinical working experiences (p=0.003).  

The data generated from present study depicts that among the 220 female health care professionals, 76 (34.5%) had favorable, and 144 (65.5%) had unfavorable attitude towards menstrual blood banking among female health care professionals of selected institutions.

The present study findings are in congruence with study done among 53 maternity nurses of Benha University Hospital and Maternity Hospital at Zagazig University Hospital Egypt on knowledge and attitude regarding cord blood collection and stem cells. The results revealed that 88.7% of nurses had poor knowledge before intervention. Though, 90.6% and 81.2% of them had good knowledge immediately and after three months of intervention respectively. Only 1.9% of the nurses’ attitude was positive toward cord blood collection and stem cells before intervention. Meanwhile, immediately and after three months of intervention the positive attitude changed to 66.0% and 69.8% respectively. The study recommended that adequately planned in-service training programs related to cord blood collection and stem cells must be established to develop nurses’ knowledge, attitude, and practices in order to fit newly developed concepts in care.

A contradictory findings were noticed in a study which was done to identify the effect of educational intervention on knowledge and attitude of nursing students regarding stem cells therapy. A quasi experimental design with pre and post-test design with convenience sampling of 53 students was used to collect data, using the knowledge and attitude of stem cell therapy questionnaire. Results showed poor knowledge about stem cells therapy in the pre-test with a remarkable improvement and statistical significance in the post-test. Although, student’s knowledge in the pre-test was poor, they showed a positive attitude toward stem cells therapy in the pre-test and post-test. The study concluded that the educational intervention was effective in improving future nurse’s knowledge and attitude regarding stem cells therapy.

Present study was done to assess the knowledge and attitude of health care professionals regarding menstrual blood banking. Outcome of this study shows that majority of the participants had average knowledge and most of them had unfavorable attitude. Considering these results, the investigators feel that there is lack of awareness among the health care professionals. The newer research evidences should be incorporated into nursing curriculum in order to update future nurses with current medical evidence based practice. The nurses also take the initiative in educating the public about the importance of menstrual blood banking as a future asset in the treatment of various diseases and encourage them to opt for menstrual blood banking facilities.

**CONCLUSION**

This study revealed that majority of people had average knowledge and most of them have unfavorable
attitude towards menstrual blood banking in India. Awareness program on the topic may change the attitude of people and menstrual blood banking may become the future hope for the cure.

Conflict of Interest – Nil

Source of Funding- Self

Ethical Clearance- Ethical considerations: Permission was obtained from Deans of various institutions, medical superintendent of the selected Tertiary Care Hospitals, Ethical clearance from the Institutional Ethical Committee of the Selected Hospital (IEC249/2015); Informed consent was taken from the study participants.

REFERENCES


11. Hend M. Azzazy, Hanem F. Mohamed. Effect of Educational Intervention on Knowledge and Attitude of Nursing Students Regarding Stem Cells Therapy. IOSR Journal of Nursing and Health Science. 2016; 5(2):75-80. Available at: www.iosrjournals.org
Nutritional and Sensory Evaluation of Moringa Oleifera Cookies

K Manivel
Assistant Professor, Hotel and Catering Management, Vels Institute of Science Technology and Advanced Studies (VISTAS), Pallavaram, Chennai

ABSTRACT

Cookies are a favorite American sweet, made from dough of cereal flour and brown sugar that contains a relatively high ratio of fat, such as butter, vegetable shortening, or margarine. The increasing popularity of cookies especially among children is growing and has become commercialized. This study is an alternative approach to biscuit manufacturing, in order to develop healthy cookies, as it would supplement the essential nutrients needed for all age groups. The different blends of cereal flour (Millet, corn meal and rye flour) with wheat flour and Moringa oleifera leaf powder were processed into cookies in the following ratios 50:30:20 (wheat flour, millet flour, Moringa) (WMM), 40:30:30 (wheat flour, rye flour, Moringa) WRM, 30:30:40 (Wheat flour, corn meal flour, Moringa) (WCM). The sensory evaluation of the cookies samples from the blends was performed using a 9-point hedonic scale. The highest mean score of the cookie was analyzed further for its nutrient content. The results of the sensory evaluation are to show that there were significant differences in the diverse attributes that were determined such as in color, texture, taste, flavor and general acceptance. It was analyzed further for its nutrient content. Incorporating moringa leaf in cookies or any other baked foods may be claimed as a means of boosting nutrition and can be served as an alternative approach to the manufacture of healthy cookies.

Keywords: Moringa oleifera, nutri cookies, Malnutrition herbal cookies, Healthy cookies.

INTRODUCTION

Cookie making ingredients are flour, eggs, sugar, butter and flavoring agent. It may comprise other ingredients such as raisins, corn flakes, chocolates, coconut powder and various nuts as per the flavor required. Cookie dough is basically made with flour, fat, moistening agent, raising agent and flavoring agent in various ratios and methods of preparation. Moringa Oleifera is used as a source of Malnutrition relief. Moringa trees have been used to resist malnutrition, especially among infants and nursing mothers. Since Moringa flourishes in arid and semiarid environments, it may provide a versatile, nutritious food source all over the year. There are lots of nutritional benefits in the whole Moringa Oleifera tree.

I have researched cookies with the leaves of Moringa Oleifera (Drumstick leaves) with regular cookie ingredients. Drumstick tree is called the powerhouse of minerals and is the most common tree in India. Its leaves, fruits, flowers, bark and seeds are all edible. They all have medicinal values and are used as ingredients in most dishes. The leaves are especially beneficial in the treatment of many ailments due to their various medicinal properties as they are rich in iron content.

NEED FOR THE STUDY

Cookies are served at high tea or as snacks across the world. The increasing popularity of cookies especially among children is growing and has become commercialized. This study is an alternative approach to biscuit manufacturers in order to develop healthy cookies, as it would supplement the essential nutrients needed for all age groups. This study is mainly targeted to reduce the malnutrition rate, which can be achieved by the consumption of Moringa oleifera. The cookie, which is made by incorporating Moringa leaves, has all the vital nutrients, which will help in bringing down the malnutrition rate to a great extent. Moringa Oleifera itself has various health benefits such as stabilizing the blood pressure, controlling glucose level in case
of diabetes, used in treating diarrhea and bronchitis. The main aim of the study is to develop and perform the sensory evaluation of Moringa oleifera cookies.

**METHODOLOGY**

The present study was undertaken to study the “sensory evaluation”. Data collected, comprised of the following:

**MATERIALS AND METHOD**

**DEFINING THE PROBLEM**

Malnutrition describes a state of imbalance between the dietary needs of the body and the type of diet provided to the body. It impacts brain development, behavioral development, cognitive development and perhaps most visibly growth development. More specifically, the numbers of underweight (low weight-for-age), stunted (low height-for-age) and wasted (low weight-for height) children are common measures for the number of malnourished children in a particular country. Children are more at risk for serious complications due to nutritional deficiencies than adults. Kids require different amounts of Iron at various ages and stages. Infants who are breastfed tend to get enough iron from their mothers only until 4-6 months of age. Iron is the major nutrient, which is used to treat malnutrition. After 12 months of age, toddlers are at risk for Iron deficiency because they are no longer entitled to breast-feeding. Thus, they are forced to consume Iron rich food in some other forms. Iron is found in foods such as dark leafy greens, red meat, and egg yolks. Moringa Oleifera is rich in Iron content. A dosage of just two or three spoonsful of Moringa leaves Powder provides a substantial amount of Iron. Moringa Oleifera when consumed in raw form is bitter in taste which makes it very hard for kids to consume them. Thus, when it is incorporated in cookies, it becomes edible and much tastier.

**SELECTION OF INGREDIENTS**

**Whole Wheat Flour**

The three parts of the wheat kernels are the germ, bran and the endosperm. Refined wheat flour is made up almost entirely of the endosperm which is a compound of starches and proteins. These proteins and starches allow a baker to create a dough with a lot of strength that turn gives the dough volume. Absence of endosperm in the dough would restrict rise or not possess a shape. This is a reason baking with a white flour is so considerable. As it has more percentage of flour protein than any other grains it can be used as an essential ingredient in cookie making. The demerits of baking with only the endosperm let’s go off all the vitamins, minerals, fats and fiber that are contained in the germ and bran during the milling process. These areas are where all the health benefits of wheat reside. It is essentially the entire kernel of wheat milled up into flour form which contains nutrition and flavor.

**Rye flour:**

Whole grain rye flour contains, as a percentage of dry matter, 56—70% starch, 8—13% proteins, 2—3% lipids, 2% ash and 15—21% total dietary fiber. In addition, it is rich in minerals, vitamins, especially B-vitamins, and phytochemicals.

**Corn-Meal flour:**

Corn meal is flour made by grinding dried corn. It can be ground into a variety of consistencies and is also known as corn flour when it is finely ground. Corn meal flour contains nutrients like vitamin B6, Carbohydrates, dietary fiber, Protein and Calories.

**Millet flour:**

Millet is a rich source of magnesium, a mineral that acts as a co-factor for more than 300 enzymes, including enzymes involved in the body’s use of glucose and insulin secretion. Millet is gluten-free and non-allergenic. In Western countries, dried leaves are sold as dietary supplements, in either powder or capsule form.
STANDARDIZATION OF MORINGA OLEIFERA COOKIES

Standardized recipes are used every day in child nutrition operations as a guide to preparing the foods served to customers. A standardized recipe is a recipe that has been carefully adapted and tested to ensure that it will produce a consistent product every time it is used. The recipes of three cookies with various flour the incorporation of moringa oleifera were developed with specific ingredients.

Table 1: Standardized Sample I, II & III — moringa oleifera and Rye, Corn-meal and Millet flour incorporated Cookies One Portion is Four Cookies (40gms)

<table>
<thead>
<tr>
<th>Ingredients for Sample I</th>
<th>Ingredients for Sample II</th>
<th>Ingredients for Sample III</th>
<th>Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole wheat flour (80gm)</td>
<td>Whole wheat flour (60gm)</td>
<td>Whole wheat flour (100gm)</td>
<td>Moringa oleifera was de-stalked, sundried and powdered.</td>
</tr>
<tr>
<td>Moringa oleifera powder (60gm)</td>
<td>Moringa oleifera powder (80gm)</td>
<td>Moringa oleifera powder (40gm)</td>
<td>Cream together all the ingredients till soft in texture.</td>
</tr>
<tr>
<td>Rye flour (60gm)</td>
<td>Corn-meal flour (60gm)</td>
<td>Millet flour (60gm)</td>
<td>The dough was refrigerated for 15mins.</td>
</tr>
<tr>
<td>Clarified Butter (90gm)</td>
<td>Clarified Butter (90gm)</td>
<td>Clarified Butter (90gm)</td>
<td>Rolled out the dough and shaped them with cookie cutter.</td>
</tr>
<tr>
<td>Honey (10ml)</td>
<td>Honey (10ml)</td>
<td>Honey (10ml)</td>
<td>baked at 170*c for 12-15 minutes.</td>
</tr>
<tr>
<td>Palm Sugar (30gm)</td>
<td>Palm Sugar (30gm)</td>
<td>Palm Sugar (30gm)</td>
<td>Cooled at room temperature</td>
</tr>
<tr>
<td>Milk powder (2gm)</td>
<td>Milk powder (2gm)</td>
<td>Milk powder (2gm)</td>
<td>Stored in air tight container</td>
</tr>
</tbody>
</table>

The recipe standardization process of the three-nutri cookies was done for recipe verification, product evaluation, and quantity adjustment. Reviewing the recipe in detail, preparing it, verifying its yield, performed recipe verification and recording changes. Product evaluation was focused in determining the acceptability of the product produced from the recipe. Changing the recipe yield and ingredient amounts was done in the quantity adjustment phase. A recipe went through all these phases several times before becoming standardized at the necessary quantity for an operation. Faculty and students of School of Hotel and catering Management worked together on the recipe standardization process. Input from students and other panel members were critical during the evaluation phase.

**SELECTION OF METHOD AND TOOL FOR THE STUDY**

Sensory method is an experimental study for the newly developed products of three different cookies in order to test, evaluate and get feedback on Sample I, Sample II and Sample III. Thirty (30) panelists were selected to conduct sensory characteristics of cookies which were assessed for sensory acceptability level of the panel members. The sensory profile was taken on appearance, odor, texture, taste, flavor and acceptence.

**PREPARATION OF HEDONIC SCORECARD**

The sensory acceptability tests for moringa oleifera cookies was determined by using 9 point hedonic scale ranging from 1 indicating Dislike Extremely to 9 suggesting Like Extremely with a neutral category of 5 indicating neither like nor dislike for parameters like appearance, aroma, texture, taste, over all acceptance using questionnaire as tool.

**CONDUCT OF THE STUDY**

Sensory tests were carried out in a sensory light and good ventilation, and away from the preparation room. All the samples were prepared with
utmost care. Texture was maintained and carried out for the same in all samples. The volume of all the samples were equal. Samples were labeled as Sample I (moringa oleifere and Rye) Sample II (moringa oleifere and Cornmeal) and Sample III (moringa Oleifere and millet) to avoid bias.

DETERMINATION OF PROXIMATE NUTRIENT ANALYSIS

The highest mean score of the product, Sample II was analyzed further for its nutrient content which includes energy, carbohydrate, fat, dietary fiber, calcium, iron and sugar\(^2\). The energy was calculated by FAO method. The proximate nutrients composition such as protein, dietary fiber, total sugar and iron of sample II was performed according to AOAC method Carbohydrates were determined by different method.

RESULTS AND DISCUSSION

The purpose of the study is to Eradicate Malnutrition. The analysis of the data results is presented in this chapter.

The results of three different samples have shown that the texture of the cookies is same in all samples and varied slightly only in Sample III. In Sample II the taste has a mean score of 8, which is greater than the other two samples. The mean scores of Aroma and Appearance in all the three samples didn’t have much of an impact. The Acceptance mean score did not have a vast difference between Sample I and Sample III but in Sample II it is 8.32 which was liked, compared to the other samples of the cookies. The results indicate that functional and adding Moringa Oleifera to many bakery products could develop health products with improved sensory quality. To make the Moringa Oleifera cookies more palatable a higher proportion of fine Moringa leaves may be incorporated.

RESULTS

Table 2- Mean Scores of Sensory Evaluation of Moringa Oleifera cookies

<table>
<thead>
<tr>
<th>SENSORY EVALUATION</th>
<th>SAMPLE I MEAN SCORES</th>
<th>SAMPLE II MEAN SCORES</th>
<th>SAMPLE III MEAN SCORES</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPEARANCE</td>
<td>7.28</td>
<td>7.68</td>
<td>7.04</td>
</tr>
<tr>
<td>TEXTURE</td>
<td>7.36</td>
<td>7.60</td>
<td>7.04</td>
</tr>
<tr>
<td>TASTE</td>
<td>6.96</td>
<td>8.08</td>
<td>7.28</td>
</tr>
<tr>
<td>ODOUR</td>
<td>7.44</td>
<td>7.88</td>
<td>7.52</td>
</tr>
<tr>
<td>ACCEPTANCE</td>
<td>7.16</td>
<td>8.32</td>
<td>7.44</td>
</tr>
<tr>
<td>OVERALL AVERAGE</td>
<td>7.24</td>
<td>7.91</td>
<td>7.26</td>
</tr>
</tbody>
</table>

Sensory Evaluation of Products

Prepared cookies were subjected to sensory analysis based on 9-point hedonic rating scale for taste, texture, appearance, aroma and after-taste Using a panel of 30 untrained members. Trained members were chefs and academicians, bakery and Culinary preparations. Panel members were advised to use sensory evaluation sheet, mark and convert them into scores. The scores were based on the following criteria: Like extremely: 9; Like very much: 8; Like moderately: 5, 7; like slightly: 6; Neither like nor dislike extremely: 1.

NUTRITIVE VALUE OF MORINGA OLEIFERA COOKIES:

(SAMPLE II MORINGA OLEIFERA AND CORN MEAL)

The proximate nutrient analysis of Sample I tisane was determined. The results expressed on 100 grams of
weight basis, are presented in table 3.

### Table 3: Proximate Nutrient Analyses

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Parameters</th>
<th>Methods</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Energy (By Calculation)</td>
<td>FAO Method</td>
<td>498.48 kcal</td>
</tr>
<tr>
<td>2.</td>
<td>Carbohydrate (By Difference)</td>
<td>CTL/SOP/FOOD/262-2014</td>
<td>65.96gm</td>
</tr>
<tr>
<td>3.</td>
<td>Total Fat</td>
<td>AOAC 19th Edn.2012,920.39g</td>
<td>23.58gm</td>
</tr>
<tr>
<td>5.</td>
<td>Dietary Fiber</td>
<td>AOAC 19th Edn.2012,985.29</td>
<td>5.79gm</td>
</tr>
<tr>
<td>6.</td>
<td>Total sugar</td>
<td>AOAC 19th Edn.2012, 925.05</td>
<td>16.15gm</td>
</tr>
<tr>
<td>7.</td>
<td>Iron as Fe</td>
<td>AOAC 19th Edn.2012, 99.11</td>
<td>2.40mg</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The study is based on the implementation of Moringa oleifera in cookies using various combinations of flours. The goal of this study is mainly to reduce the rate of malnutrition by adding Moringa in the cookies as the core ingredient to make Moringa tasty. When Moringa is consumed barely it is bitter in taste. This Cookies helps in improving nutrition value. The medicinal values present in the Moringa oleifera is also present in the cookies therefore there are various health benefits in the cookies. Moringa has been advocated as a natural nutrition for the tropics and is being used to combat malnutrition due to its high protein and fiber content. The developed product of this cookies for this study may be served as an alternative approach to the manufacture of healthy cookies.

**CONCLUSION**

There are various types of cookies prepared by using different ingredients. A Moringa Oleifera cookie aims at increasing the nutritional value and eradicating malnutrition. Nowadays throughout the world people are consuming Herbal Cookies, Non-Processed foods, organic vegetables, etc. For a disease-Free and healthy life consuming the Moringa Oleifera in the form of cookies makes it more edible and tasty. Usually Herbal items though it has lots of medicinal, it cannot be eaten without processing. These leaves are incorporated in various medicines since olden days. In Ayurveda this is the most important ingredient, thus incorporating it in cookies makes it healthy and edible. Incorporating Moringa leaf in cookies or any other baked food may be claimed as a means of boosting nutrition in India where Malnutrition is prevalent. The developed product of Moringa Oleifera cookies for this study may be served as an alternative. In the manufacturing of cookies. It is high time that we kick-start our life with our undiscovered leaves. Limitations of the study are, Eliminating the raw smell from the cookies was a little tough job, the leaves are to be cleaned carefully as it has lots of stalk in it, Preserving the Moringa oleifera leaves were hard, The moisture in the leaves had to be shallow fried in clarified butter to enhance the flavor for cookies and it had to be dried properly before it was added as an ingredient.

**Conflicts of Interest:** Conflicts of Interest declared none.

**Source of Funding –** Self

**Ethical Clearance -** Nil

**REFERANCE**


5. Amelia, E. J. “Feeding and Hydration Issues for Older Adults with Dementia.” Nursing Clinics of North America 39 (September 2004)


Occupational Health Hazards among IT Sector Women Employees in Tamil Nadu

B Chithirai Rajan¹, M Prabhakar Christopher David²

¹Assistant Professor, Department of Economics, Vels Institute of Science, Technology and Advanced Studies – VISTAS (Deemed to be University), ²Assistant Professor, Department of Business Administration, Vels Institute of Science, Technology and Advanced Studies – VISTAS (Deemed to be University)

ABSTRACT

In view of this healthcare importance, the real economic growth rate depends on the quality of human life especially in improving the women's standard of living around the world. At present, a large number of women are working in all sectors viz., primary sector, secondary sector and service sector in both the rural and urban areas. Further, they are actively participating in each and every job and express their knowledge and capacity to the society. However, most of the women are dominated by men and are affected psychologically and are under pressure in their work places. The term occupational hazards refer to a risk accepted as a consequence of a particular occupation. Regarding the occupational problems, the women employees in IT sector are facing health hazards like eye fatigue, headache, thyroid problem and others. It could be seen that over a past decade, a large number of women employees in IT sector suffer from heart related diseases. Moreover, the Poor health creates huge strain on physical and mental pressure in working places. At present, the large numbers of women employees also face many social, cultural and economic challenges. Hence, this study is an attempt to identify and analyse the reasons that affects the health of IT sector women employee respondents and give suitable measures to reduce the work related stress in IT sector among women employee respondents. Further, this study focused on primary data and the tools of analyses with using statistical techniques like percentages, t-test and rank value method. As a result found that, the urban area women respondents are highly affected as compared to that of rural area women respondents among the IT sector field. By and large, the study suggested that spiritual meditation is a way to help the reducing stress in psychologically and work related stress reduced through improving communication and technical skill.

Keywords: Women empowerment, health, IT sector, stress, economic development, communication skill, spiritual meditation

INTRODUCTION AND STATEMENT OF THE PROBLEM

In view of this healthcare importance, the real economic growth rate is based on to develop the quality of human life and especially to improve the women's standard of living around the world. The human development report (1995) stated that the basic capability for human development are living a long and healthy life, being educated and better standard of living in a society¹. At present, a large number of women are working in all sectors like primary sector, secondary sector and service sector in which both rural and urban areas. Further, they are actively participating in each and every job and exposure their knowledge and capacity to the society. However, most of them women are conquered by men and they are affected in both psychology and mental pressure in working places². The term occupational hazards refers to the stress related to the works require to be addressed without any delay. Regarding the occupational problems, the software women employees are facing continuously like eye fatigue, headache, thyroid problem and others. It could be seen that over a past decade, a huge number of software women employees are suffered due to heart diseases. Moreover, the Poor health creates huge strain on physical and mental pressure in working places³. At present, the large numbers of women employees are facing many problems from different directions like social problems, cultural problems, and economic problems. More specifically,
women are not only facing problems in working places and from her homes also. But some of them are actively participated in domestic work like cooking, washing, drawing water, preparing food and so on. Additionally, the physical health was majorly suffered due to that insufficient sleep as regularly. Meantime, without yoga activity may be disturbed their psychological feelings also. The adverse impact of health is one of the major problems to makes gender equities in the society. In view of these all problems, maintaining health nutrition, and yoga and exercises, proper training and improving knowledge, good sleeping, and air conditioner facilities are the major solution to reduce their stress in software industries. Hence, the present study makes an attempt to analyze the health hazards among IT sector women employees in Tamil Nadu.

**OBJECTIVES**

To analyse the reasons for health affect in IT sector women employee respondents in selected region.

To suggest the suitable measures to prevent the work related stress in IT sector.

**HYPOTHESIS**

Rural area women employees are majorly affected as compared to urban area women employees in IT sector.

**METHODOLOGY**

Drawn from the present study has been focused on primary data and it involves a multi-stage sampling method. Further, the present study is covered four stages and the accurate information is derived from the field of inquiry in IT sector, Chennai city, Tamil Nadu: (i) Selection of Chennai district in Tamil Nadu, (ii) Selection of major towns’ viz., Ambattur, Thiyagarayanagar, Kodambakkam and Nungambakkam in Chennai district (iii) Selection of few software industries in selected areas, (iv) Selection of rural area and urban area women employee respondents according to Tamil Nadu state and Other States in software sector. Among these four stages of investigation, 115 sample respondents are selected for the present study. In which, 63 respondents are collected from Tamil Nadu state and the remaining 52 respondents are collected from other states viz., Kerala, Bangalore, Sikkim, etc. Out of these 63 women respondents in Tamil Nadu, 27 respondents belonging to rural areas and the remaining 36 respondents are belonging to urban areas. On the other hand, out of 52 respondents in other states women respondents, 23 respondents are belonging to rural areas and the remaining 29 respondents are belonging to urban areas. In whole, 50 respondents are from rural area respondents and the remaining 65 respondents are from urban area respondents. Moreover, the present study is used by the convenient sampling method and the period covers from 2017 - 2018.

**TOOLS FOR DATA ANALYSIS**

To analyse the reasons for health affect in IT sector women employee respondents, rank analysis and t-test analysis have been applied.

To identify the major factors to prevent the work related stress in IT sector, the percentage analysis has been employed.

**RESULTS AND DISCUSSIONS**

**TABLE 1: CAUSES OF WORK RELATED STRESS**

<table>
<thead>
<tr>
<th>Dimension on job stresses</th>
<th>Rural Area (Mean Value)</th>
<th>Rank</th>
<th>Urban Area (Mean Value)</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Discrimination</td>
<td>7.23</td>
<td>7</td>
<td>6.80</td>
<td>10</td>
</tr>
<tr>
<td>Wage Discrimination</td>
<td>6.92</td>
<td>10</td>
<td>6.94</td>
<td>8</td>
</tr>
<tr>
<td>Heavy Workload</td>
<td>7.64</td>
<td>6</td>
<td>7.23</td>
<td>6</td>
</tr>
<tr>
<td>Gender Discrimination</td>
<td>7.70</td>
<td>5</td>
<td>6.89</td>
<td>9</td>
</tr>
<tr>
<td>Unable to achieve their Target</td>
<td>5.78</td>
<td>12</td>
<td>7.20</td>
<td>7</td>
</tr>
<tr>
<td>Family Problems</td>
<td>7.98</td>
<td>4</td>
<td>8.90</td>
<td>2</td>
</tr>
</tbody>
</table>
Cont... TABLE 1: CAUSES OF WORK RELATED STRESS

<table>
<thead>
<tr>
<th>Dimension on job stresses</th>
<th>Rural Area (Mean Value)</th>
<th>Urban Area (Mean Value)</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Discrimination</td>
<td>7.23</td>
<td>6.80</td>
<td>-2.019</td>
<td>.002*</td>
</tr>
<tr>
<td>Wage Discrimination</td>
<td>6.92</td>
<td>6.94</td>
<td>-1.090</td>
<td>.078(NS)</td>
</tr>
<tr>
<td>Heavy Workload</td>
<td>7.64</td>
<td>7.23</td>
<td>0.989</td>
<td>.049**</td>
</tr>
<tr>
<td>Gender Discrimination</td>
<td>7.70</td>
<td>6.89</td>
<td>-2.109</td>
<td>.067(NS)</td>
</tr>
<tr>
<td>Unable to achieve their Target</td>
<td>5.78</td>
<td>7.20</td>
<td>2.009</td>
<td>.093(NS)</td>
</tr>
<tr>
<td>Family Problems</td>
<td>7.98</td>
<td>8.90</td>
<td>-1.897</td>
<td>.003**</td>
</tr>
<tr>
<td>Health Issues</td>
<td>8.98</td>
<td>9.94</td>
<td>-3.478</td>
<td>.042**</td>
</tr>
<tr>
<td>Problem with Co-workers</td>
<td>8.23</td>
<td>8.89</td>
<td>-2.870</td>
<td>.021**</td>
</tr>
<tr>
<td>Could not provide maternity Leave</td>
<td>7.18</td>
<td>6.78</td>
<td>-3.092</td>
<td>.088(NS)</td>
</tr>
<tr>
<td>Poor working place</td>
<td>8.30</td>
<td>7.80</td>
<td>0.678</td>
<td>.097(NS)</td>
</tr>
<tr>
<td>Sexual Harassment</td>
<td>6.99</td>
<td>6.21</td>
<td>-0.110</td>
<td>.027**</td>
</tr>
<tr>
<td>Nightshift Work</td>
<td>6.78</td>
<td>8.01</td>
<td>1.201</td>
<td>.044**</td>
</tr>
</tbody>
</table>

Source: Computed, *1% level of significant, **5% level of significant, NS – Not significant
Table 2 examines the job related stress with testing of t-test analysis. The null hypothesis is based on “rural area women respondents are highly affected in work related stress with compared to urban area women respondents”. The following results are mentioned the rural area respondents are highly suffered in job related stress with compared to urban area respondents. Age discrimination is found to statistically significant at 1% level, and the remaining factors are statistically significant at 5% level viz., heavy workload pressure, family issues, health problems, problem with co-worker, sexual harassment and working in night shift are found to be highly affected in rural area as compared to urban area respondents. Hence, accept the null hypothesis for the above mentioned factors. Rests of them, wage discrimination, gender discrimination, unable to achieve their target, could not provide maternity leave and the remaining poor working places are not significant. As a result found that, the urban area respondents are highly affected in these mentioned factors as compared to that of rural area women respondents. Hence, reject the null hypothesis for above the mentioned factors and accepted alternative hypothesis.

**TABLE 3: IMPACT ON PERSONAL STRESS USING ANOVA**

<table>
<thead>
<tr>
<th>Factors</th>
<th>Groups Variable</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Care</td>
<td>Between Groups</td>
<td>.106</td>
<td>1</td>
<td>.106</td>
<td>.112</td>
<td>.739</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>258.450</td>
<td>113</td>
<td>.954</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>258.557</td>
<td>114</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Issues</td>
<td>Between Groups</td>
<td>.802</td>
<td>1</td>
<td>.802</td>
<td>1.014</td>
<td>.315</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>214.260</td>
<td>113</td>
<td>.791</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>215.062</td>
<td>114</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Financial</td>
<td>Between Groups</td>
<td>1.265</td>
<td>1</td>
<td>1.265</td>
<td>1.378</td>
<td>.241</td>
</tr>
<tr>
<td>Burden</td>
<td>Within Groups</td>
<td>248.874</td>
<td>113</td>
<td>.918</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>250.139</td>
<td>114</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source*: Computed

Table 3 interprets the impact on personal stress among IT sector women employees. It is seen that the rural area women respondents are highly affected due to the personal stress as compared to urban area respondents. The personal stress factors such as child care, family issues, and personal financial burden are statistically not significant at 5% or 1% level. Thus it leads to accept the alternative hypothesis i.e., urban area women respondents are highly affected in personal stress as compared to rural area respondents.

**Table 4: Prevention of Work Related Stress**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>YES</th>
<th>NO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Discussion with Other Employees</td>
<td>96</td>
<td>19</td>
<td>115</td>
</tr>
<tr>
<td>Improve Communication and Technical Skill</td>
<td>82</td>
<td>33</td>
<td>115</td>
</tr>
<tr>
<td>Proper Training</td>
<td>78</td>
<td>37</td>
<td>115</td>
</tr>
<tr>
<td>Spiritual Meditation</td>
<td>99</td>
<td>16</td>
<td>115</td>
</tr>
<tr>
<td>Yoga and/or Exercises</td>
<td>83</td>
<td>32</td>
<td>115</td>
</tr>
</tbody>
</table>
Table 4 exhibits the factors attributing to prevent the work related stress among IT sector women employees in selected region. It is seen that more than three fourth of the respondents are stated that agree with spiritual meditation may reduce the work related stress which constitute 86.1 percent, followed by 83.5 percent of them where recorded group discussion with other employees, nearly three fourth of the respondents (72.2%) are agree with yoga and/or exercises may reduce the work related stress, 71.3 percent of them recorded that improving communication and technical skills and the least recorded by the proper training method at 67.8 percent in selected region. It is noticed that on the table, spiritual meditation and group discussion may reduce the work related stress among IT sector women employees.

**POLICY SUGGESTIONS**

Protecting the women employees for the long hours of work in the software sector. Because the long hours of work due to increase the physical stresses and psychological stresses. Hence, all the software institutional should banned the long hours of work.

Improve the gender sensitive related and monitor progress about regulatory framework, software technologies and labour policies, and create infrastructural facilities are drawn it by the regulatory information as follow the ICT policies.

Improve the software mechanisms monitor the progress and to encourage gender development in IT field.

All the software institutions should strengthen their capacity through technical support, gender equality and ICT.

All the software institutions should provide the training facilities to the employees for improving the technical and communication skills and create more employment opportunities.

Government should promote software technologies, because it gives more taxation to the central and state governments.

Government should collaborate with ICT sector. Because recently number of people depend on the software technologies. If the Government undertakes the ICT, it will helpful to increase the most employment opportunities.

**REFERENCES**

Gender Preference and Awareness of PCPNDT Act among Rural Reproductive Age Group Women

Rock Britto1, M Srinivetha2, G Sathvik2, T Subashri2, S Elango3
1Assistant Professor, Dept of Community Medicine, 2Medical Intern, 3Professor and HOD, Dept of Community Medicine, Chennai Medical College Hospital and Research Centre, Irungalur, Trichy

ABSTRACT

Introduction: Sex ratio is defined as number of females per 1000 males. Decline in sex ratio leads to child marriage and poor status of women and it will affect us socially, economically and politically. The Government of India introduced the Preconception and Prenatal Diagnostic techniques act in 2003 to prevent the misuse of modern medical technologies for prenatal sex determination. This study was conducted among rural women of reproductive age group (20-35yrs) in a village of Trichy, southern India with the aim of studying gender preference and awareness about PCPNDT act.

Method: This cross sectional study was conducted using a questionnaire which comprised two sections including Socio demographic details and questions regarding gender preference, awareness about PCPNDT act.

Results: In our study, 120(60%) knew that prenatal sex determination was possible, 106(53%) participants had gender preference and Out of the participants preferring gender, 96(90.6%) of them preferred male babies. Mother-in-laws were the major persuaders. Relatives were the major source of information regarding prenatal sex determination tests. Only 29(14.5%) knew about the PCPNDT act.

Conclusion: Majority of the study population were aware of the possibility to do prenatal sex determination using Ultrasound techniques but not aware of the PCPNDT act and its provisions. Apart from legislative measures, people need to be educated about gender equality and PCPNDT Act.

Keywords: PCPNDT act, prenatal sex determination, reproductive women, gender preference.

INTRODUCTION

Sex ratio is defined as number of females per 1000 males. As per 2011 census, sex ratio in India is 940 females per 1000 males, which continues to be significantly adverse towards women1. Decline in sex ratio leads to child marriage and increasing number of child brides leads to poor status of women and it will affect us socially, economically and politically. There will be increased mother and child morbidity and mortality associated with early child birth. An associated phenomenon is the abduction and trafficking of girls. In this distorted social scenario marked by growing anti-social behaviour, crimes against women like rape, molestation, eve teasing, child marriages; forced polyandry etc. is also expected to rise. Adverse sex ratio also called female deficit syndrome female feticide, sex selective abortion is being the most common scenario in the present two child norm.

Child sex ratio indicates future sex ratio prediction. According to census 2011, child sex ratio for India is 919. Sex selective abortion has mainly two determinants- Gender preference and Sex determination. Former is influenced by beliefs in the Community and latter is influenced by Health Care providers and legislators.
Sex selective abortion is almost reported across every part of our nation irrespective of the socioeconomic status, religion and rural or urban background. Usage of appropriate modern technological advancement like ultrasound paves the way for prenatal identification of the sex and thereby declining sex ratio at birth. The main reason for female feticide is that female child are vulnerable to harassment and burden of dowry for the parents at their later stages while a male child earns and supports the family.

The government of India introduced the prenatal diagnostic techniques act in 1994 which was later amended in 2003 to the Preconception and Prenatal Diagnostic Techniques Act. The violation of this act can lead to a fine of Rs.10000 and three years imprisonment for first offence and further increase in punishment and fine for subsequent offences. The significance of this law is that it was necessitated to prevent the misuse of modern technology. It does not involve only change in social behaviour and practices; it demands ethical medical practice and the regulation of medical technologies that have the potential to be misused. This thus puts onus on the medical professionals and the general public as well. It is the responsibility to educate the people about the PCPNDT act and its significance. This does not involve only change in social behaviour and practices; it demands ethical medical practice and the regulation of medical technologies that have the potential to be misused. This thus puts onus on the medical professionals and the general public as well. It is the responsibility to educate the people about the PCPNDT act and its significance. This study was conducted among reproductive age group women (20-35yrs) to study gender preference pattern and awareness regarding provisions of PCPNDT act.

OBJECTIVES

To determine the gender preference and awareness about PCPNDT act among women of reproductive age group (20-35 years of age) in villages of Trichy district.

MATERIALS AND METHOD

This study was conducted in a rural area (Sangenth Village) in Trichy district, south India. The study population included women of reproductive age group (20-35 years of age). A total of 200 women participated in the study. After obtaining informed written consent and explaining the purpose of the study, data was collected using a pre-structured questionnaire which comprised a set of questions which included demographic details, socio economic status, gender preference and awareness. Participant’s identity and collected information were kept confidential.

STATISTICAL ANALYSIS

Data were entered in MS EXCEL and statistical analysis done using EPIINFO software.

RESULTS

1. The results of our study are discussed in the following headings:

2. Socio-demographic details.

3. Gender preference.

4. Who persuade for prenatal sex determination?

5. Knowledge about possibility of prenatal sex determination and opinion about prenatal sex determination

6. Source of information for prenatal sex determination

7. Awareness about the provisions of PCPNDT act

1. Socio Demographic details:

A total of 200 reproductive women of age between 20-35 years were assessed for their knowledge, awareness and attitude regarding prenatal sex determination and PCPNDT act using a questionnaire. Results can be represented here using descriptive statistics which includes socio demographic details and key findings as represented in pie, bar and table separately. Age of the participants ranged between 20-35 years with mean age of 27 years, median of 27 and mode of 28, Standard deviation 3.515.

Majority of the study participants were housewives 81, (40.5%). Most of the participants completed middle school 69, (34.5%). About 11 participants were illiterate (5.5%). Among them, most study participants belonged to nuclear family 145, (72.5%). Among our study population, most of them belonged to middle and upper middle socio economic scale (According to modified BG Prasad scale, 2014). These demographic details are illustrated in table 1.
Table 1: Socio demographic details of the study population

<table>
<thead>
<tr>
<th>Socio Demographic Factor</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural labourer</td>
<td>39</td>
<td>19.5</td>
</tr>
<tr>
<td>Daily wage labourer</td>
<td>29</td>
<td>14.5</td>
</tr>
<tr>
<td>Housewife</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td>Teacher</td>
<td>19</td>
<td>9.5</td>
</tr>
<tr>
<td>Tailor</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Others</td>
<td>25</td>
<td>12.5</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>11</td>
<td>5.5</td>
</tr>
<tr>
<td>Primary</td>
<td>21</td>
<td>10.5</td>
</tr>
<tr>
<td>Middle</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td>Higher secondary</td>
<td>52</td>
<td>26</td>
</tr>
<tr>
<td>UG</td>
<td>33</td>
<td>16.5</td>
</tr>
<tr>
<td>PG</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Family</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint</td>
<td>43</td>
<td>21.5</td>
</tr>
<tr>
<td>Nuclear</td>
<td>145</td>
<td>72.5</td>
</tr>
<tr>
<td>Extended</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>Three generation</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Socioeconomic class (BG Prasad’s Classification)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>Upper middle</td>
<td>97</td>
<td>48.5</td>
</tr>
<tr>
<td>Middle</td>
<td>94</td>
<td>47</td>
</tr>
<tr>
<td>Lower middle</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Lower</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

2. Gender preference:

Male babies were the most preferred gender even nowadays. Among our study participants, 106 (53%) had gender preference and out of them 96 (48%) preferred male over female babies. (Figure 1)
Who persuade for prenatal sex determination?

On analysis, it was found out that mothers-in-law were the major persuaders towards prenatal sex determination tests (102, 51%) followed by husbands (28, 14%). (Figure 2)

![Figure 2 Who persuades for prenatal sex determination?](image)

Knowledge about possibility of prenatal sex determination:

Among the study group, 120 (60%) of the study participants knew that prenatal sex determination was possible and 30 (15%) of them told it was not possible. (Figure 3)

![Figure 3 Knowledge about possibility of prenatal sex determination:](image)

Source of information about prenatal sex determination:

According to our study, relatives were the major source of information regarding prenatal sex determination tests (106, 53%) followed by friends (58, 34%). (Figure 4)

![Figure 4 Source of information:](image)

Awareness about PCPNDT act:

On observation of our study analysis, only 29 (14.5%) of the study participants knew the Government act against prenatal sex determination. (Figure 5)

![Figure 5 Awareness about PCPNDT act:](image)

Irrespective of their knowledge on PCPNDT act, 40 (20%) of study participants knew that prenatal sex determination was punishable. Among the participants who knew prenatal sex determination is punishable, 26 (13%) knew that both doctors and people who seek for prenatal sex determination tests are punishable.

**DISCUSSION**

In India, first legal response to control the practice of sex determination and sex selective abortions came into effect in the year 1994 through the introduction of PNDT act which was amended later in 2004 as PCPNDT (Pre-Conception and Prenatal Diagnostic Techniques) act. Though sex selective abortions have been reported all over India, registration and punishment rates have been less so far. Low registration and punishment rates may be due to improper implementation and lack of awareness of the act among public. In our study, 53% (106) of the participants had gender preference and among them, 96 of the participants need male babies. This indicates that gender preference is still prevalent.

In our study, mothers-in-law were the major persuaders towards prenatal sex determination. They can be educated regarding gender equality during antenatal visits of their daughters-in-law. About 60% (120) of the participants didn’t know the possibility of prenatal sex determination, which is still an advantage for preventing sex selective abortion. Only 29 (14%) were aware of the PCPNDT act, which indicates that media, health care personnel, etc should take part in disseminating knowledge about gender equality and PCPNDT act. People should be educated that, those who seek for prenatal sex determination tests are also punishable by law, thus reducing the rate of prenatal sex determination.

In the present study, 60% of the participants knew about possibility of sex determination which was lower
than the study conducted at Puducherry (82.03%)\textsuperscript{9}, Mumbai\textsuperscript{8}, Maharashtra (73.5%) and Bareilly, Uttar Pradesh (80%)\textsuperscript{7}. In our study, only 21.5% were aware that USG is used for prenatal sex determination, which was lower than the study conducted in Puducherry (91.4%)\textsuperscript{9}, Hassan (73%)\textsuperscript{10} and Mumbai (91.4%)\textsuperscript{8}.

Relatives (53%) were the main source of information in our study. Our observations were similar to the study conducted in Jammu\textsuperscript{11} which was conducted in rural area among 400 people. In a study reported from Hassan (90%)\textsuperscript{10}, media was the main source of information.

In the present study, 14.5% of participants were aware of the government law against prenatal sex determination and 20% of the total participants knew that prenatal sex determination was punishable. These were lower than the study conducted in Puducherry (awareness of government law- 67.9%, punishable- 84.3%)\textsuperscript{9}, Hassan (punishable-53%)\textsuperscript{10} and Mumbai (awareness of government law- 34.3%, punishable- 44.1%)\textsuperscript{8} among which Puducherry (160 pregnant women)\textsuperscript{9} and Mumbai (143 pregnant women)\textsuperscript{8} were hospital based study while Hassan study included Teachers\textsuperscript{10}.

In our study, 1.5% said that only doctors should be punished, 4.5% said that only people who seek for sex determination should be punished and 13% were aware that both doctors and people who seek sex determination should be punished. This was lower than the study conducted in Puducherry (only doctors are punishable-3.9%, only people are punished-19.53%, both are punishable- 71.88%)\textsuperscript{9}.

CONCLUSION

More than half of our study population knew about the prenatal sex determination, still only one-tenth of them knew it was punishable. Nearly half of the study population preferred to know the sex of their unborn child and out of them 90% preferred male babies. Apart from legislative measures, people need to be educated about gender equality and PCPNDT Act.

Ethical Clearance: Obtained from Institutional Ethical committee, Chennai Medical College Hospital and Research Centre, Trichy, Tamil Nadu – 621105.

Funding: None

Conflict of Interest: Nil

REFERENCES

8. Shidhaye PR, Giri PA, Nagaonkar SN, Shidhaye RR. Study of knowledge and attitude regarding prenatal diagnostic techniques act among the pregnant women at a tertiary care teaching hospital in Mumbai. Journal of education and health


Breast Feeding Literacy and Belief - A Community based Cross Sectional Study among Reproductive Age Group Women in Tamil Nadu

Neethu George, Meera George, Rock Britto D, Vinodhini, Varshitha Kutchre, Yogesh, S Elango

1Assistant Professor, Department of Community Medicine, CMCH&RC, Trichy, Tamil Nadu, 2Assistant Professor, Department of Community Medicine, Travancore Medical College, Kollam, Kerala, 3CRRI, 4Professor and Head, Department of Community Medicine, CMCH&RC, Trichy, Tamil Nadu

ABSTRACT

Background: Breast feeding have several benefits to both mother and infant; however despite strong evidences in support of breast feeding, its ignorance has remained high worldwide. Objectives: To assess the knowledge and attitude regarding breast feeding and its practices among reproductive age group women in rural area in Tamil Nadu. Materials and Method: A cross sectional community based study including 116 married reproductive age group women. A structured interview schedule consisting of questions about knowledge about breast feeding and Iowa Infant Feeding Attitudes Scale to assess attitude was administered to 116 reproductive age group women Result: Out of 116 subjects, 31.85% practiced exclusive breast feeding and only 61.2% of participants were aware of exclusive breast feeding, all the participants felt initial milk to be discarded, 8.6% are aware that breastfeeding protects against cancer; 23.2% felt that water is essential for baby along with breast milk; 25.8% were aware that lactation can be used as a contraceptive modality. Majority 103(88%) of mothers had neutral attitude towards breast feeding. Conclusion: The attitude and knowledge level towards breast feeding is still remaining low, which signifies the urgent need to address the issue. Like unmet needs for family planning “unmet adequacy of breast feeding” should be assessed and addressed.

Keywords: Attitude, Belief, Breast feeding, Knowledge, Literacy, Reproductive age group women

INTRODUCTION

Breastfeeding is one of the life saving nutrition for children and also improves future health for both mother and child. More than 15% of 24 lakh death could be averted in India by optimal feeding practices. Over the last couple of decades there has been an increase interest in the promotion of exclusive breast feeding as best feeding method for new borns. Exclusive breast feeding is as infant feeding with human milk without addition of any other liquids or solids. The WHO and UNICEF (1990) have recommended exclusive breast feeding for six months followed by introduction of complementary foods and continue breast feeding for 24 months or more.

For infants not being breast fed there is increased incidence of infectious morbidity like otitis media, gastroenteritis and pneumonia. There is also evidence of an increased incidence of breast cancer, ovarian cancer in mothers who neglect feeding. The positive effects of breast feeding in the mortality pattern, intelligence and long term consequences on their life is well recorded.

For effective promotion of breast feeding active intervention should be promoted in the fields of health systems and services, home and family environment, community environment, work environment and policy environment or a combination of any of above.
recent years breast feeding has declined as a result of urbanization and maternal employment outside the home which eventually lead to formula feeding. In this study we aimed to assess the knowledge and attributes regarding breastfeeding and its practices among the reproductive age group of women in Tamil Nadu.

**METHODOLOGY**

This was a community based cross sectional study conducted among married reproductive age group women (18-49 years) who were selected consecutively for a period of 2 months (Dec 2017-Jan 2018). The study was conducted in Sangethi village (the rural field practice area of the institution) in Trichy district, Tamil Nadu.

The sample size was calculated using an estimated 50% prevalence of good knowledge about breast feeding. For 95% confidence limits and an absolute precision of 10%, calculated sample size was 96. Adding 10% non response rate, the minimum sample size came up to 106.

The predesigned structured questionnaire which included three parts

Part A: Socio-demographic data including age, education, income, religion, marital status.

Part B: Knowledge regarding breast feeding and practices (15 questions). Correct answer was awarded one point and wrong zero.

Part C: The Iowa Infant Feeding Attitudes Scale (IIFAS)\(^4\) was used to assess mothers’ attitudes toward breastfeeding. The scale included 17 attitude items to determine level of agreement to each question. A 5-point Likert scale from strongly disagrees to strongly agree was applied to all questions. Approximately half of the questions were negatively worded (i.e. 1, 2, 4, 6, 8, 10, 11, 14, and 17). Total IIFAS score ranged from 17 to 85 with higher scores reflecting more positive attitudes on breastfeeding. Total scores were grouped into three, (1) positive to breastfeeding (70-85), (2) neutral (49-69), and (3) positive to formula feeding or negative to breast feeding (17-48).

Written informed consent was obtained from the mothers who were willing to participate in the study. The data were analyzed using Epi info software. The relationship between Knowledge scores, IIFAS scores and socio-demographic variables was tested using appropriate tests.

**RESULTS**

**Socio-demographic details**

The sample of reproductive age group married women (n=116) were of the age range from 19-45 years. The mean age (± SD) of the population was 29.91(±6.04) years. Maximum 45(38.8%) of the population belonged to more than 30 years. Majority 74(66.4%) of them had school education. More than half 64(53.4%) were homemakers and 61(52.6%) belonged to joint family. Majority 88(75.9%) of them were Hindu religion and had a mean (±SD) age at marriage of 21.84 (±2.81) years. Mean (±SD) years of marital life were 8.27(±6.62) years. The mean (±SD) age at marriage of the group was 21.84 (±2.81) years. Mean (±SD) years of marital life were 8.27(±6.62) years.

**Mother’s Knowledge about the breast feeding**

The mean (±SD) knowledge score of the women was 9.39 (±1.55) which shows more than 50\(^{th}\) percentile and range of the score lies between 6 and 14. (Table 1)

<table>
<thead>
<tr>
<th></th>
<th>True(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Protection for baby</td>
</tr>
<tr>
<td>2</td>
<td>Breast milk is the ideal food for the baby</td>
</tr>
<tr>
<td>3</td>
<td>Water is essential for baby along with breast milk</td>
</tr>
<tr>
<td>4</td>
<td>Prelacteal feeds are good to the baby</td>
</tr>
<tr>
<td>5</td>
<td>Initial milk – colostrums to be discarded</td>
</tr>
<tr>
<td>6</td>
<td>Promotes mother-baby relation</td>
</tr>
<tr>
<td>7</td>
<td>Frequent sucking increases breast milk production</td>
</tr>
<tr>
<td>8</td>
<td>Lactation helps lose weight gained during pregnancy</td>
</tr>
<tr>
<td>9</td>
<td>Lactation prevents next pregnancy</td>
</tr>
<tr>
<td>10</td>
<td>Protection against cancer</td>
</tr>
<tr>
<td>11</td>
<td>Breast feeding should be stopped after 6 months</td>
</tr>
<tr>
<td>12</td>
<td>Drugs can be excreted in breast milk</td>
</tr>
<tr>
<td>13</td>
<td>Smoking can affect breastfeeding</td>
</tr>
<tr>
<td>14</td>
<td>Alcohol can affect breastfeeding</td>
</tr>
<tr>
<td>15</td>
<td>Duration of exclusive breastfeeding is 6 months</td>
</tr>
</tbody>
</table>
In the study we found that majority of attitude questions scored a mean score of 3 or above indicating a neutral to positive attitude towards breast feeding. (Figure 2)
In the study we did Kruskal Wallis test to find association between socio-demographic variables and knowledge score. Variables like family type, religion and act of giving prelacteal feeds were significantly associated with knowledge score. Other variables were not significantly associated with knowledge score.

**Table 2: Multiple linear regression, factors associated with knowledge score**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>95% confidence interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of family</td>
<td>0.38</td>
<td>0.09 to 0.85</td>
<td>0.12</td>
</tr>
<tr>
<td>Religion</td>
<td>0.09</td>
<td>0.44 to 0.24</td>
<td>0.57</td>
</tr>
<tr>
<td>Prelacteal feeds</td>
<td>0.83</td>
<td>0.24 to 1.42</td>
<td>0.006</td>
</tr>
</tbody>
</table>

*Significant p value <0.05

The table shows multiple linear regressions of knowledge score with the socio-demographic variables. Act of giving prelacteal feeds was found to be significant. Median knowledge score was 10 for those who didn’t give prelacteal feeds compared to a score of 9 for those who gave. If one unit change happens in not giving prelacteal feeds knowledge score change by 0.83 and is statistically significant.

In the study we did one way Anova test to find association between socio-demographic variables and attitude score. Variables like family type, type of delivery, duration of exclusive breast feeding and act of giving prelacteal feeds were significantly associated with attitude score. Other variables were not significantly associated with attitude score.

**Table 3: Multiple linear regression, factors associated with attitude score**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>95% confidence interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of family</td>
<td>0.73</td>
<td>-2.19 to 0.72</td>
<td>0.73</td>
</tr>
<tr>
<td>Type of delivery</td>
<td>1.53</td>
<td>-3.36 to 0.29</td>
<td>0.04*</td>
</tr>
<tr>
<td>Prelacteal feeds given</td>
<td>4.42</td>
<td>2.12 to 6.71</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Exclusive breast feeding</td>
<td>0.81</td>
<td>-1.31 to -0.30</td>
<td>0.002*</td>
</tr>
</tbody>
</table>

*Significant p value <0.05

The table shows multiple linear regressions of attitude score with the socio-demographic variables. Type of delivery, duration of exclusive breast feeding and act of giving prelacteal feeds were significant. Mean attitude score for people who had normal delivery were more compared to those who had caesarean section. If one unit change happens in type of delivery attitude score change by 1.53 and is statistically significant.

Mean attitude score of people who didn’t give prelacteal feed was 67.11 compare to score of 61.94 for those who gave. If one unit change happens in not giving prelacteal feeds attitude score change by 4.42 and is statistically significant.

Mean attitude score of people who exclusively breast feed for six months was less compare to those who did. If one unit change happens in decreased duration of exclusive breast feeding attitude score change by 0.8 and is statistically significant.

**DISCUSSION**

This study investigated knowledge and attitude of breast feeding among reproductive age group women. WHO recommends six months of exclusive breast feeding for infants, but in our study, 31.86% of participants practiced exclusive breast feeding. This finding is lower compared to that of NFHS 4 data of India (54.9%) and Tamil Nadu (48.3%).

In our study all the participants felt initial milk to be discarded, in contrary to other studies in India where the importance of colostrum was known to 56% of mothers and 75-90% of mothers. In our study, only 8.6% were aware that breastfeeding protects against cancer; 23.2% felt that water is essential for baby along with breast milk; 25.8% are aware that lactation can be used as a contraceptive modality..

Regarding the knowledge score mean score lies more than the 50th percentile denoting good knowledge about breast feeding which is consistent with other studies. In our study women from joint and extended family, Muslim religion and who didn’t give prelacteal feeds scored more in knowledge score. Women who live with multiple family members got influenced by family (particularly grandmother) in the decision and may result in increased knowledge. This finding is consistent with other studies.
Knowledge score was more among Muslim religion in this study can be due to decreased number of Muslim participants and also continued support from the part of the family for breast feeding which is similar to other studies.21

In the study we found that majority 103(88.8%) had neutral attitude towards breast feeding which is comparable to a study done in Bangalore.18, 22, 23 Highest neutral attitude was in the questions “Fathers feel left out if a mother breast feeds” (66.38%), “Breast milk is lacking in iron” (51.7%) and” Breastfed babies are more likely to be overfed than formula fed babies” (37.93%). This result is similar to other studies.21 In the present study 93.97% of the mothers believed that breastfeeding is healthier for babies. This result is higher than the results of other studies.21, 24 Mothers’ negative attitude toward breastfeeding could be due to lack of mothers’ knowledge about breast milk contents and benefits and lack of facility to support mother’s breastfeeding in workplace, feel uncomfortable to breastfeed in public places and negativity towards father’s involvement in breastfeeding.

This study showed attitude score was more for those from joint family, who had normal delivery, those who didn’t give prelacteal feeds and those who exclusively breast fed less than 6 months. Again family influences the attitude as more support and supervision would be there in joint family with respect to a nuclear family. Also there will be a significant attitude change among working mothers and non working which is not significant in this study. Normal delivery may have made the women more comfortable in breast feeding due to the physical condition and immediate recovery than who had caesarean section. The finding that women who had exclusively breast fed less than 6 month having more favorable attitude than the other is in contrast to other studies25, 26 which shows favorable attitude for those who exclusively breast fed for more than 6 months. The reason can be that women, who exclusively breast fed children for less than 6 months, may have suffered adverse events for infant or mother which was attributed to lack of breast feeding by health care practitioners. The study lacked qualitative approach which prevented the researchers from delving deeper into other issues like cultural beliefs and deep rooted fads/myths regarding feeding practises. The study would have been more informative if more women were involved in different periods of their life like adolescent people, antenatal women, postnatal women and women in the late age groups. Also the knowledge and attitude of health care practitioners about breast feeding should have provided the present level of quality in health system.

CONCLUSION

This study reveals that knowledge and attitude of mothers towards breastfeeding is far from satisfactory. There is still a need for programmes which support and encourage breastfeeding focusing more on the benefits of breast milk. Training of health care deliverers in institutional setups on need for appropriate and timely intervention in certain breast feeding pattern like discarding initial milk should be executed. Also counseling of antenatal mothers on breastfeeding must be stressed.

Funding: None

Conflict of Interest: None declared

Ethical Approval: Taken

REFERENCES


A Study on Implementation of Powdered Cottonseed and Oil on Bread

K Manivel
Asst. Professor, School of Hotel and Catering Management, Vels Institute of Science Technology and Advanced Studies (VISTAS), Pallavaram, Chennai, India

ABSTRACT

In general, bakers use refined flour for making various bread products. In this project we have made an attempt to add powdered cottonseed and oil as an adjunct. We have incorporated powdered cottonseed proportionate to whole wheat flour (i.e., 10: 90; 20:80; 30: 70) in making breads. During this attempt, it was found that these products tasted better than whole wheat breads. The tested products were found to have better taste, texture, aroma and overall appearance by the panelists using hedonic rating scale. As compared with bread from whole wheat, the tested products with powdered cottonseed have improved volume. The combination of whole wheat flour and powdered cottonseed has good hydration characteristics, creates high-fiber and/or reduced-calorie breads. Also, we believe the tested products using powdered cottonseed will help people to overcome certain nutritional deficiencies, specifically vitamin A, D and E.

Keywords: Implementation, Powdered Cottonseed, Wheat, Cottonseed Bread

INTRODUCTION

Cotton (Gossypium hirsutum) ranks next to corn and wheat in value in most of the western countries (Morrison, 1956). Cotton, the king of natural fibers is mainly cultivated for its lint which is the most sought-after textile fiber till date due to its inherent eco-friendly and comfort characteristics. It is also one of the important cash crops of many of the Afro-Asian countries like India, Iran, Egypt, Sudan, Uzbekistan, Tanzania, etc. and plays a major role in their economic development. This research was aimed at the implementation of the powdered cottonseed and oil on bread products. We have used powdered cottonseed and cottonseed oil under various proportions in making bread products. We have made three samples of bread products with different proportions of powdered cottonseed and cottonseed oil in the recipes. We have incorporated powdered cottonseed proportionate to whole wheat flour (i.e., 10: 90; 20:80; 30: 70) in making breads. It contains a high amount of antioxidants which are essential for good health. It is also rich in Vitamin E, which like antioxidants, is important in fighting free-radicals. It is well known that as much as 60-70% of seed is available from seed cotton during ginning. Cottonseed oil is obtaining by extracted from the seeds of cotton plants of various species, mainly Gossypium hirsutum and Gossypium herbaceum. Cottonseed oil has traditionally been used in foods in ayurvedic cooking in Asian countries as shortening product. Cottonseed oil is a popular frying oil for the restaurant and snack-food manufacturing industries. In this research we have incorporated cottonseed oil as moistening agent for bread products. Cottonseed oil is low in cholesterol which makes it a great choice for those who want to lower their cholesterol levels. It has a light, neutral taste that is accepted by people who do not like oils with concentrate flavors.

NEED FOR THE STUDY

The market for bread products has opened a gateway for enormous growth of Bakery. Anybody from any country loves bread products and has become a favorite one. It reflects the irony and latent humor that life often presents with and which we are often unable to appreciate. Certain bread products are good for health and at the same time satisfy taste buds has indulgent food option. From the above factors it has become prominent the bread product has played a dominant role in the industry. This helps to generate awareness and also become a convenient food for all age group. This study is considered as an important one to analyze the pros and cons and health benefits of implementation of
powdered cottonseed in the bread products.

**SCOPE OF THE STUDY**

Use of same vegetable oil for repeated frying, common practice across the country in spite of health hazards. Food safety and standards authority has noted that the repeated use of same oil making dough in bread products leads to changes in the physiochemical, nutritional and sensory properties of edible oil. Keeping this in view, the quality of the oil must be monitored to avoid the use of degraded oil for cooking purposes. Instance, Omega 3 fatty acid is only found in mustard, rape seed, flax seed oil and soy-bean oil. In this study cotton oil was used as an alternate ingredient which provides supplementary benefits to the human body system. Also, we believe the tested products using powdered cottonseed and their oil will help people to overcome certain nutritional deficiencies, specifically vitamin A, D and E.

**OUTCOME OF THE STUDY**

At the outset it has been found that the implemented cottonseed bread products are good in taste and nutritive values. It is also price reasonable so that volume of scale is also satisfactory. Marketing is facing a healthy competition in which Cottonseed has enormous fiber content. The panelists prefer the most implementation of cottonseed product and its flavor. The product is generally having a warm welcome from the untrained panelists. This study analyses the implementation of cottonseed in the bread products and its nutritional benefits.

**PILOT STUDY**

The study which is done among the panelists helped in finding the overall quality of the cottonseed implemented bread products. The samples were given to the panelists and they were requested to evaluate the products using the hedonic scale method. The total sample of the target market segment is around 50 panelists.

**MATERIALS AND METHODOLOGY**

**Collection of Materials:**

Cottonseeds were procured from a local market. The main ingredients of the bread includes flour, yeast, sugar, salt, water cottonseed oil were also collected. The different quantities of ingredients taken for the sample A, B and C were given in the table below:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Ingredients</th>
<th>Sample-A</th>
<th>Sample-B</th>
<th>Sample-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Powdered Cottonseed</td>
<td>20 grams</td>
<td>40 grams</td>
<td>60 grams</td>
</tr>
<tr>
<td>2</td>
<td>Whole Wheat Flour</td>
<td>180 grams</td>
<td>160 grams</td>
<td>140 grams</td>
</tr>
<tr>
<td>3</td>
<td>Salt</td>
<td>5 grams</td>
<td>5 grams</td>
<td>5 grams</td>
</tr>
<tr>
<td>4</td>
<td>Sugar</td>
<td>30 grams</td>
<td>30 grams</td>
<td>30 grams</td>
</tr>
<tr>
<td>5</td>
<td>Yeast</td>
<td>10 grams</td>
<td>10 grams</td>
<td>10 grams</td>
</tr>
<tr>
<td>6</td>
<td>Cottonseed Milk</td>
<td>25 ml</td>
<td>50 ml</td>
<td>75 ml</td>
</tr>
<tr>
<td>7</td>
<td>Water</td>
<td>75 ml</td>
<td>50 ml</td>
<td>25 ml</td>
</tr>
<tr>
<td>8</td>
<td>Cottonseed Oil</td>
<td>2 tbsp</td>
<td>2 tbsp</td>
<td>2 tbsp</td>
</tr>
</tbody>
</table>

**Bread Production incorporated with cottonseed powder:**

The cottonseeds were allowed to dry in the sunlight and it was powdered without the cotton linter.

The cottonseeds were soaked overnight and the milk was extracted from the soaked cottonseeds. The cottonseed milk was ensured that it should doesn’t have any impurities.
The dough were kneaded for 5-7 minutes

The cottonseed oil was applied on the dough and it was allowed for first fermentation upto 20 minutes.

After the dough is fermented, it was divided into 35-40 grams each.

The divided dough was then shaped and arranged in a greased tray.

Then it was allowed for second fermentation, upto 20 minutes.

After the dough is fermented completely, it was baked in 220C for 15-20 minutes until it gave Golden Brown colour.

Once the dough was baked it was allowed to cool for some time. Then the breads were demounted from the tray.

STATISTICAL TOOLS USED

Analysis of data is the process by which data is converted into useful information. Raw data as collected from questionnaires cannot be used unless it is processed in some way to make it amenable to drawing conclusions. The various statistical tools used by the researcher for data analysis in this study are:

- **Percentage Analysis**
- **t-Test**

Graphs were used to represent the data for the better and accurate interpretation of results.

**Percentage analysis:**

Percentage method is used to make significant comparisons between various sets of data. Each items in the table is expressed as a percentage of the total in such way as to facilitate comparison of data and to describe the relationship between the variables under study. The formula used here is given below.

\[
\text{Percentage} = \left( \frac{\text{Number of Respondents}}{\text{Total Respondents}} \right) \times 100
\]

**t-Test**

T-tests are used to compare two means to assess whether they are from the same population. T-tests presume that both groups are normally distributed and have relatively equal variances. The t-statistic is distributed on a curve that is based on the number of degrees of freedom (df). There are three kinds of t-tests: independent-samples, paired-samples, and one-sample.

**Sensory Evaluation**

These sensory evaluation methods are widely used both by the food industry and academics. Sensory analysis of food relies upon evaluation by our senses (odour, taste, colour, tactile, temperature, pain etc). Only by applying exact scientific testing methods can reproducible results be obtained and analyzed statistically. In the present study the sensory evaluation was carried on between three various proportions of implemented cottonseed bread to find out the acceptance level of Sample A, B & C with 50 untrained panelists of School of Hotel and Catering Management Students and faculty from the Vels University, Tamil Nadu, India and completed the questionnaire. Sample infusions were coded A, B and C and served randomly to panelists. About 30 gm of each infusion was served in a full plate. Three samples were served at a time. The tests were carried out in ten minutes time. The sensory acceptance studied which includes taste, colour, aroma and temperature. Panel members scored their accepted level on a 9-point Hedonic scale. In this approach numbers from 1 to 9 were assigned to the scale’s and score 9 indicates ‘like extremely’, score 1 indicates ‘dislike extremely’ and score 5 indicates neither like or dislike.

**Calculations of Nutritive Value**

All three types of standardized bread incorporated with powdered cotton seed and cotton seed oil were calculated for its nutritional value using Calculation Nutritive values of Indian Foods by NIN.

**Statistical Analysis**

Sensory scores of three types of standardized bread incorporated with powdered cotton seed and cotton seed oil were dealt by usual statistical procedures. The mean and the difference between mean (t-test) was calculated. The mean scores obtained for code C was high and there was significant difference between the Code B and C.

**RESULTS AND DISCUSSIONS**

The present investigation was undertaken with the following major objectives.

To study about the implementation of powdered
To study about the use of cottonseed oil in bread products as a moisturizing agent.

To study about the nutritional content of powdered cottonseed and cottonseed oil.

To study about the proportion in which the powdered cottonseed and its oil implemented in bread products.

To study about the drawback of implementation of powdered cottonseed in bread products.

This chapter furnishes the findings of the study entitled “A Study on Implementation of Powdered Cottonseed and Oil on Bread Products”. The results are categorized and presented in this chapter under the following headings:

**Sensory Analysis of Bread Samples incorporated with powdered cottonseed and cottonseed oil**

Percentage was calculated for Sensory analysis of bread Samples incorporated with powdered cottonseed and cottonseed oil of three samples such as Sample A, Sample B and Sample C. The Sample A implemented with 25% of powdered cottonseed and cottonseed oil, Sample B implemented with 50% of powdered cottonseed and cottonseed oil, Sample C were implemented with 75% powdered cottonseed and cottonseed oil.

### Table 2: Percentage Distribution of Sensory Scores of Sample A

<table>
<thead>
<tr>
<th>S. No</th>
<th>Test Scores</th>
<th>Percentage (%) of Taste Scores (N=50)</th>
<th>Percentage (%) of Texture Scores (N=50)</th>
<th>Percentage (%) of Appearance Scores (N=50)</th>
<th>Percentage (%) of Flavour Scores (N=50)</th>
<th>Percentage (%) of Overall Scores (N=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>54%(27)</td>
<td>50%(25)</td>
<td>40%(20)</td>
<td>50%(25)</td>
<td>56%(28)</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>32%(16)</td>
<td>36%(18)</td>
<td>46%(23)</td>
<td>34%(17)</td>
<td>26%(13)</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>8%(4)</td>
<td>12%(18)</td>
<td>14%(7)</td>
<td>8%(4)</td>
<td>8%(4)</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>6%(3)</td>
<td>2%(1)</td>
<td>0(0)</td>
<td>8%(4)</td>
<td>10%(5)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%(50)</td>
<td>100%(50)</td>
<td>100%(50)</td>
<td>100%(50)</td>
<td>100%(50)</td>
</tr>
</tbody>
</table>

### Table 3: Percentage Distribution of Sensory Scores of Sample B

<table>
<thead>
<tr>
<th>S. No</th>
<th>Test Scores</th>
<th>Percentage (%) of Taste Scores (N=50)</th>
<th>Percentage (%) of Texture Scores (N=50)</th>
<th>Percentage (%) of Appearance Scores (N=50)</th>
<th>Percentage (%) of Flavour Scores (N=50)</th>
<th>Percentage (%) of Overall Scores (N=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>6%(3)</td>
<td>4%(2)</td>
<td>10%(5)</td>
<td>14%(7)</td>
<td>14%(7)</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>44%(22)</td>
<td>56%(28)</td>
<td>42%(21)</td>
<td>44%(22)</td>
<td>48%(24)</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>40%(20)</td>
<td>36%(18)</td>
<td>44%(22)</td>
<td>30%(15)</td>
<td>30%(15)</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>10%(5)</td>
<td>4%(2)</td>
<td>4%(2)</td>
<td>12%(6)</td>
<td>8%(4)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%(50)</td>
<td>100%(50)</td>
<td>100%(50)</td>
<td>100%(50)</td>
<td>100%(50)</td>
</tr>
</tbody>
</table>
Table 4: Percentage Distribution of Sensory Scores of Sample C

<table>
<thead>
<tr>
<th>S.No</th>
<th>Test Scores</th>
<th>Percentage (%) of Taste Scores (N=50)</th>
<th>Percentage (%) of Texture Scores (N=50)</th>
<th>Percentage (%) of Appearance Scores (N=50)</th>
<th>Percentage (%) of Flavor Scores (N=50)</th>
<th>Percentage (%) of Overall Scores (N=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>8%(4)</td>
<td>10%(5)</td>
<td>2%(4)</td>
<td>10%(5)</td>
<td>6%(3)</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>26%(13)</td>
<td>24%(12)</td>
<td>44%(22)</td>
<td>30%(15)</td>
<td>36%(18)</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>24%(12)</td>
<td>48%(24)</td>
<td>20%(10)</td>
<td>52%(26)</td>
<td>44%(22)</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>42%(21)</td>
<td>18%(9)</td>
<td>32%(16)</td>
<td>8%(4)</td>
<td>14%(7)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%(50)</td>
<td>100%(50)</td>
<td>100%(50)</td>
<td>100%(50)</td>
<td>100%(50)</td>
</tr>
</tbody>
</table>

Table 5: Significant score from the overall sensory evaluation for all the Sample -A, B, C

<table>
<thead>
<tr>
<th>S. No</th>
<th>Sensory Attributes</th>
<th>Significant Score for Sample A</th>
<th>Significant Score for Sample B</th>
<th>Significant Score for Sample C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Taste</td>
<td>7(6.66)</td>
<td>8(7.54)</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Texture</td>
<td>7(6.66)</td>
<td>7(7.40)</td>
<td>8(7.74)</td>
</tr>
<tr>
<td>3</td>
<td>Flavor</td>
<td>7(6.74)</td>
<td>7(7.40)</td>
<td>8(7.8)</td>
</tr>
<tr>
<td>4</td>
<td>Appearance</td>
<td>7(6.74)</td>
<td>7(7.42)</td>
<td>8(7.58)</td>
</tr>
<tr>
<td>5</td>
<td>Overall</td>
<td>7(6.72)</td>
<td>7(7.32)</td>
<td>8(7.66)</td>
</tr>
</tbody>
</table>

SUMMARY

The summary stated in this chapter gives a vital description about the procedure used for data collection and analysis undertaken for the study. Different aspects of rear in connection data is analyzed using various statistical tools and charts. The hedonic rating scale and assessed for its organoleptic qualities like taste, texture, flavor, appearance and overall acceptance of the bread products. Bread products were served to untrained panelists. Panelists asked to access each coded sample, comparing it to the control (C), and to point the degree of difference using a 9-point scale where 0 = neither like nor dislike and 9 = extremely like. The significant sensory score of the Taste was 7(6.66), Texture was 7(6.66), Flavor was 7(6.74), Appearance was 7(6.74), Overall was 7(6.72) for the Sample-A. The significant score for the mean of the Taste was 8(7.54), texture was 7(7.40), Flavor was 7(7.40), Appearance was 7(7.42), Overall was 7(7.32) for the Sample-B. From the above findings of the sensory evaluation it is evident that the sample-C which has the highest proportion of powdered cottonseed and cottonseed milk has the highest significant score among the three samples.

CONCLUSION

Major consumers of bread are people from the lower middle class and economically weaker segments is blamed for wide spread poor health. Bread is the economical and basic instant food available for consumption. In India bread is still a secondary staple food when compared to chapati, puri or rice. It is important to realize that when bread ingredients especially refine flour is used vital nutrients are destroyed and also become unfit to consume. The tested bread products prepared with cottonseed were found to have better taste, texture, aroma and overall appearance by the panelists. As compared with bread from whole wheat, the tested products with powdered cottonseed have improved volume. The combination of whole wheat flour and powdered cottonseed has good hydration characteristics permits large percentage of the flour in bread to create high-fiber and/or reduced-calorie breads. In terms of bread when the nutritious part of the grain is removed it essentially becomes a form of sugar. The end result of excessive consumption of white bread and other processed form of grain products results in nutritional deficiencies in particular contribute to a wide range of illness. From this project it is suggested to shed excess fat and improve health is to moderate and
normalize the insulin response by limiting the intake of refined flour. Also, we believe the tested products using powdered cottonseed will help people to overcome certain nutritional deficiencies, specifically vitamin A, D and E. It also has enormous fiber content as the cotton by nature rich in fiber. It is recommended that the cottonseed bread can be a substitute for the whole wheat bread in the same economic price with reasonable nutritive content. This product can be successfully developed in the bakery industry in future.

Conflicts of Interest: The Authors Declare No Conflict Of Interest.

Source of Funding – Self

Ethical Clearance - Nil

REFERENCES


2. Chandan Prasad “Consumption of a Diet Rich in Cottonseed Oil (CSO) Lowers Total and LDL Cholesterol in Normo-Cholesterolemic Subjects” Pg. No 4 (June 2012)

3. N. P. Osti and S. B. Pandey “Use of Whole Cotton Seed and Cotton Seed Meal as a Protein Source in the Diet of Ruminant Animals: Prevailing situation and opportunity” (2011)


7. Dan Gui Wenbin Liu, Xianping ShaoWeina Xu “Effects of different dietary levels of cottonseed meal” (2013)

8. Tashev & Todorov, (2009) CSM was incorporated in dairy animal diet

9. Thomas B. Osborne and Lafayette B. Mendel “The Use of Cottonseed as Food”

10. Charles E. Munroe, “The use of cottonseed oil as food, and for medicinal purposes”


12. J.T.Lawhon, C.M. Hater, “A Whippable Extract From Glandless Cottonseed Flour”


15. Dimple Singh-Ackbarali, Rohanie Maharaj. Sensory Evaluation as a Tool in Determining Acceptability of Innovative Products Developed by Undergraduate Students in Food Science and Technology at The University of Trinidad and Tobago. Journal of Curriculum and Teaching. 2014;3(1): 10-27.
Phacoemulsification in Patients with Fuchs Heterochromic Iridocyclitis

Mukesh Singh Rajpoot¹, Pritee Chouhan², Rahul Bhargava³, Anuj Chauhan⁴, Shiv K Sharma⁵
¹Consultant, Laser Eye Clinic Noida, ²Resident, Mahatama Gandhi Medical College, Indore, ³Director, Laser Eye Clinic Noida, ⁴Resident, Laser Eye Clinic, Noida, ⁵Director, Rotary Eye Hospital, Palampur

ABSTRACT

Purpose: To compare the safety and efficacy of phacoemulsification to treat cataract in patients with Fuchs heterochromic iridocyclitis (FHI).

Method: A Retrospective, multicenter study was done. Patients with cataract after FHI who had phacoemulsification were evaluated retrospectively. Complications (intraoperatively and postoperatively), operative time, visual acuities, and surgically induced astigmatism were evaluated.

Results: The mean follow-up period was 10.46 ± 2.56 months. The types of cataract included posterior subcapsular cataract in 45 (86.5 %) eyes and milky cataract white in 7 (13.4 %) eyes. The mean preoperative vision was 0.8 ± 0.24. The mean day 1 post-operative vision was 0.28 ± 0.26 (Figure1). The mean final vision was 0.24 ± 0.10 (P <0.001). The BCVA remained less than 6/60 due to recurrent uveitis, glaucoma, vitreous opacities, healed posterior KP’s and CME. However, pre-operative vitreous opacities (P =0.001) and posterior KP’s (P = 0.006) had a significant effect on the final visual outcome.

Conclusions: Patients with a history of FHI and cataract having phacoemulsification with PC IOL implantation had excellent visual results with a relatively low complication rate.

Keywords: Phacoemulsification, Fuchs Heterochromic iridocyclitis, Cataract.

INTRODUCTION

Fuchs heterochromic iridocyclitis (FHI) is an inflammatory eye disease of unknown cause. It is still a matter of debate, what triggers inflammation in FHI; the rubella virus, Toxoplasma gondii, and cytomegalovirus have been some of the probable causes.¹

The prevalence of cataract in FHI is about 15% to 75%. ² Cataract surgery in patients with uveitis is often done to visually rehabilitate the patients and better visualize the fundus to manage posterior segment pathology.³ However, he most important step in the management of complicated cataracts is adequate preoperative control of inflammation; most authors consider the absence of cells in the anterior chamber to be synonymous with inflammatory control, as mild cellular reaction in the vitreous may persist even in inactive stages of FHI.⁴

The management, visual outcomes, and postoperative course in patients with uveitis may vary according to the type of uveitis as well as the technique of cataract surgery. Conventional extracapsular cataract extraction (ECCE) was associated with complications like bleeding from fragile vessels, posterior capsular rent with vitreous loss, secondary glaucoma, and retinal detachment. However, with modern small incision surgical techniques, introduction of acrylic intraocular lenses (IOLs), and more in-depth management of complications, there has been a great improvement in visual outcomes in patients with FHI. Phacoemulsification is now the preferred surgical modality of treating cataract in patients with uveitis.⁵⁶
In the present study we retrospectively reviewed the outcomes of phacoemulsification in patients with FHI.

**MATERIAL AND METHOD**

Fifty-four eyes of 48 patients with FHI who had phacoemulsification with in-the-bag implantation of intraocular lens were evaluated retrospectively; and the primary and secondary outcome measures evaluated were the postoperative vision and complication rate.

The diagnosis was based on the criteria proposed by Kimura et al. \(^7\); the institutional review boards and the local ethics committees approved the trial. A written, informed consent for the study, based on Helsinki protocol was obtained from all the participating patients.

**Exclusion criteria**

Patients were excluded if their follow-up period was of less than six months and if they had posterior synechiae, cystoid macular edema (CME) and a history of trauma and systemic diseases like diabetes mellitus. Patients with sulcus-to-sulcus and sulcus-to-bag implantation of the IOL were also excluded from the study.

The primary outcome measure was improvement in the post-operative visual acuity. The secondary outcome measure was the rate of postoperative complications.

The pre-operative protocol included routine investigations such as total and differential leucocyte counts, erythrocyte sedimentation rate and blood sugar levels, Mantoux test, chest X-ray, X-rays of the cervical spine and sacroiliac joints. Special investigations included rheumatoid factor, angiotensin converting enzyme assay, anti-nuclear factor, human leucocyte antigen typing and enzyme-linked immunosorbant assay (ELISA) for TORCH infections (Toxoplasmosis, Other agents, Rubella, Cytomegalovirus and Herpes), human immunodeficiency virus and tuberculosis.

B-scan ultrasonography was performed in cases where funduscopy was not possible due to a dense cataract. Gonioscopy was done in all patients with Sussman’s four mirror, hand-held gonioscope (Ocular Instruments, USA). Intraocular pressure was measured with applanation tonometry.

A minimum inflammation free period (defined as five or less than five cells per high power field in the anterior chamber) of a minimum of three months was a pre-requisite for eligibility for surgery.\(^8\) Pre-operatively, topical antibiotic eye drops were prescribed to all patients. No patient received oral corticosteroids.

**SURGICAL TECHNIQUE**

Peribulbar anaesthesia was delivered. Asepsis was achieved; this included ciprofloxacin (0.3%) eye drops 6 to 8 times, 24 hours before the procedure; instillation of 5% povidone-iodine solution in the cul-de-sac before surgery; and ensuring patency of the nasolacrimal duct. In the preoperative holding area, periocular skin was cleansed with 10% povidone-iodine solution. On the operating table, periocular cleansing was repeated and a drop of 5% povidone-iodine solution instilled on the ocular surface.

Phacoemulsification was performed with peribulbar anaesthesia. Two side-port corneal incisions were created 180 degrees apart with a 20G microincision vitrectomy knife. Anterior chamber entry was fashioned with a 2.8-mm keratome. Anterior chamber was maintained with 2% hydroxypropyl methylcellulose. Trypan blue—assisted continuous curvilinear capsulorrhexis was done as described previously. Cortical cleavage hydrodissection was done just below the anterior capsule rim and the nucleus rotated in the bag. Phacoemulsification was performed with an Infinity vision system (Alcon, Inc) using the phaco-chop method. Bimanual irrigation/ aspiration technique removed cortical matter. IOL was implanted in the capsular bag. Paracentesis was hydrated. At the end of surgery, a subconjunctival injection of 20 mg gentamicin and 4 mg dexamethasone was given to all patients.

**POSTOPERATIVE CARE**

Patients were followed up on the first, third, and seventh postoperative days, then weekly for 2 weeks, monthly for 2 months, and every 3 months thereafter. The postoperative regimen included topical moxifloxacin every 4 hours for 7 days and topical betamethasone 0.1%, every 2 hours, tapered over 6 to 8 weeks depending on response. At each follow-up day, VA, AC reaction, and vitreous haze were evaluated. Goldman applanation tonometry was done on the first postoperative day, and if normal, repeated at monthly intervals for 3 months. Detailed fundus examination was done at 1 week, 1 month, and repeated at 3-month intervals.
STATISTICS

Vision was compared using the non-parametric Wilcoxon Test. The final vision and complication rate were compared with Mann Whitney test. The P value was calculated at 1 % and 5 % levels. A P value less than 0.001 at 1 % and less than 0.005 at 5 % was considered statistically significant.

RESULTS

Two cases were excluded as their follow-up period was of less than six months. The number of valid cases was 52. The mean age was 36.41± 3.66 years. The types of cataract included posterior sub-capsular cataract in 45 (86.5 %) eyes and milky cataract white in 7 (13.4 %) eyes.

ELISA for TORCH infections was positive in one case. The mean follow-up period was 10.46 ± 2.56 months. Table 1 shows the baseline characteristics of the patients.

Snellen’s visual acuity was converted to Log MAR units for comparison. The mean preoperative vision was 0.8 ± 0.24. The mean Day 1 post-operative vision was 0.28 ± 0.26 (Figure 1). The mean final vision was 0.24 ± 0.10 (P <0.001) (Figure 2). Table 2 shows the percentage of patients at each level of corrected distance vision (CDVA). At the final follow-up, 88.6% of the patients had a vision of 0.5 or better (6/12).

The BCVA remained less than 6/60 due to recurrent uveitis, glaucoma, vitreous opacities, healed posterior KP’s and CME.

PREOPERATIVE SEQUELAE AND FINAL VISION

Pre-operative findings like heterochromia, iris atrophy or nodules, and vessels on the trabecular meshwork (TM) when present did not have a significant effect on the final visual acuity (Figure 1). However, pre-operative vitreous opacities (P =0.001) and posterior KP’s (P = 0.006) had a significant effect on the final visual outcome (Table 2).

OCULAR INFLAMMATION

twenty eyes had a mild to moderate anterior chamber reaction on the first post-operative day.

At the end of the first post-operative month, six eyes had 2 + anterior chamber cells and four eyes had 1 + anterior chamber cells. Topical steroids were continued for eight weeks and resulted in the resolution of inflammation in most of these cases. However, five eyes had recurrent episodes of uveitis and developed PCO subsequently. Nd: YAG capsulotomy was offered after a quiet phase of three months. The eyes with recurrent uveitis had persistent vitreous haze at the final follow-up examination. (P = 0.001).

COMPLICATIONS

Intraoperative complications (Table 3) included hyphema in three eyes (5.7 %), which did not obscure visualization during surgery. Posterior capsule rent with a vitreous loss occurred in one case. A multi-piece PMMA IOL was implanted in the sulcus following anterior vitrectomy. The implanted IOLs were Acrylic in 17 eyes, PMMA in 34 eyes and silicone in 1 eyes. PMMA IOLs were implanted in those patients who could not afford foldable lenses.

The PCO was significantly more in the PMMA group (P = 0.001). There was no case of new onset postoperative glaucoma. However, the eyes of six patients had medically-controlled glaucoma prior to the surgery. At a mean postoperative duration of 1.86 ± 0.81 months, elevated IOP was seen in five eyes. A sustained rise of IOP, despite maximum topical therapy, developed in three eyes (P = 0.074). These patients were referred to the glaucoma clinic for further management. New-onset CME was clinically seen in sic (11.5 %) eyes. CME was detected within the second month in three eyes and within four months in the rest of the eyes.

Topical therapy with ketorolac four times a day for six weeks resulted in the resolution of the

CME in three eyes. However, two eyes with recurrent uveitis and one eye following Nd: YAG laser capsulotomy, had persistent CME on the final follow-up (P = 0.060). Posterior capsule opacification was a common cause (12/19 %) of postoperative reduction of vision (P < 0.001).

The mean duration of PCO after surgery was 3.42 ± 1.78 months. Pearl form of PCO was seen in eight (62.3 %) eyes and the fibrous form in four (33.3 %) eyes. All eyes with PCO except one achieved good vision after Nd: YAG laser capsulotomy; and CME was the cause of reduced vision in this one eye.
Table 1: Baseline Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>36.41±3.66</td>
</tr>
<tr>
<td>Sex n (%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>30 (57.7)</td>
</tr>
<tr>
<td>Female</td>
<td>22 (42.3)</td>
</tr>
<tr>
<td>Follow up (months)</td>
<td>10.46 ± 2.56</td>
</tr>
<tr>
<td>Preoperative VA (Log MAR)</td>
<td>0.8 ± 0.24</td>
</tr>
<tr>
<td>Postoperative VA (day 1)</td>
<td>0.28 ± 0.26</td>
</tr>
<tr>
<td>Postoperative VA (final)</td>
<td>0.24 ± 0.10</td>
</tr>
</tbody>
</table>

Table 2 Pre-operative finding and visual outcome

<table>
<thead>
<tr>
<th>Pre-op finding</th>
<th>N</th>
<th>%</th>
<th>P value (Mann Whitney test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heterochromia</td>
<td>36</td>
<td>69.2</td>
<td>0.103</td>
</tr>
<tr>
<td>Iris atrophy</td>
<td>8</td>
<td>15.3</td>
<td>0.973</td>
</tr>
<tr>
<td>Iris nodules</td>
<td>0</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>Vitritis</td>
<td>8</td>
<td>15.3</td>
<td>0.008</td>
</tr>
<tr>
<td>Raised IOP</td>
<td>5</td>
<td>9.6</td>
<td>0.079</td>
</tr>
<tr>
<td>Vessels on TM</td>
<td>4</td>
<td>7.6</td>
<td>0.074</td>
</tr>
<tr>
<td>Posterior KP’s</td>
<td>10</td>
<td>19</td>
<td>0.006</td>
</tr>
</tbody>
</table>

Table 3 Complication and visual outcome

<table>
<thead>
<tr>
<th>COMPLICATION</th>
<th>n</th>
<th>%</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyphema</td>
<td>3</td>
<td>5.7</td>
<td>0.079</td>
</tr>
<tr>
<td>IOL deposits</td>
<td>1</td>
<td>1.9</td>
<td>0.185</td>
</tr>
<tr>
<td>PCO</td>
<td>11</td>
<td>21.1</td>
<td>0.001</td>
</tr>
<tr>
<td>Vitreous opacities</td>
<td>4</td>
<td>7.6</td>
<td>0.002</td>
</tr>
<tr>
<td>Secondary glaucoma</td>
<td>3</td>
<td>5.7</td>
<td>0.597</td>
</tr>
<tr>
<td>Recurrent uveitis</td>
<td>4</td>
<td>7.6</td>
<td>0.002</td>
</tr>
<tr>
<td>Persistent CME</td>
<td>3</td>
<td>5.7</td>
<td>0.081</td>
</tr>
</tbody>
</table>

DISCUSSION

Cataract is a common complication of FHI. However, unlike age-related cataract, patients present at a relatively younger age (<40 years). In the present study, the mean age at presentation was 36.4 ± 3.66 years.

The treatment of cataract in patients with FHI has evolved from intracapsular cataract extraction and conventional ECCE to phacoemulsification and from implantation of AC IOLs to acrylic posterior chamber IOLs. Younger patient age and the posterior subcapsular location of most of these cataracts make phacoemulsification an easy procedure with fewer complications. In most countries and settings, phacoemulsification is now the preferred technique of cataract surgery. However, the outcomes of cataract surgery are sometimes difficult to assess as eyes with different types of uveitis respond differently to surgery.
In a RCT, Bhargava et al found that phacoemulsification is not always successful in fragmenting extremely dense nuclei with extensive posterior synechia; therefore, in general, authors routinely performed scleral tunnel incisions for phacoemulsification of uveitic cataracts, as it may be necessary to enlarge the incision to facilitate manual nuclear extraction. However, as synechia do not occur in FHI, scleral tunnel incisions were not done in the present study. 10

Intraocular lens implantation in an inflamed eye may cause concern because of exaggerated postoperative inflammation. However, FHI is not typically associated with severe uveitis in the postoperative period. In the present study, a mild to moderate reaction was seen in 15.3% of eyes. Recurrent uveitis with persistent vitreous haze at final follow-up examination was seen in 4.6% of eyes. Due to lack of posterior synechia in FHI and the fact that peripheral iridectomy was not performed in any case, postoperative inflammation was relatively mild. In a series of 103 eyes with complicated cataract after FHI and ECCE or phacoemulsification with posterior chamber IOL implantation, Tejwani et al did not find any case with severe postoperative inflammation, although 3 eyes had persistent vitreous haze at final follow-up. 6

Most studies report excellent visual outcomes after cataract surgery in FHI. In the present study, 88.6% of patients achieved a CDVA of 20/63 or better at 6 months. Moreover, the mean SIA was significantly lower as compared to other studies in which small incision cataract surgery (SICS) was done in uveitic cataract (P < 0.001). Presumably, this was a result of the larger incision used by these authors for SICS. Our results were comparable to the studies by Budak et al and Gee and Tabbara. 11-12

Posterior capsule opacification is a common complication in FHI, with an incidence of 20% to 40%. 13-14 The incidence of PCO in our study was 21%. The incidence of PCO is significantly higher with polymethyl methacrylate IOLs as compared with acrylic IOLs, and PCO rates do not significantly differ between hydrophobic or hydrophilic acrylic IOLs at 6 months’ follow-up. 15-16 The higher incidence of PCO in the present study could be explained by the fact that a significant number of patients had PMMA implanted due to financial constraints.

Although there was no case of new onset postoperative glaucoma, the eyes of 8 patients had medically controlled glaucoma before surgery. Elevated IOP was seen in 3 eyes at a mean postoperative duration of 1.06 ± 0.4 months; 3 eyes developed a sustained rise in IOP despite maximum topical therapy with 2 drugs. These patients were referred to the glaucoma clinic for further management.

A shortcoming of the present study is that only 1 technique of phacoemulsification was studied. The results and complications like endothelial cell loss may vary slightly with the technique of nucleus delivery or chopping used. 17

In conclusion, patients with a history of FHI and cataract having phacoemulsification with PC IOL implantation had excellent visual results with a relatively low complication rate.

Conflict of Interest: We do not have any conflict of interest.

Funding Source: None

Acknowledgements: None

REFERENCES


6. Tejwani S, Murthy S, Sangwan VS. Cataract extraction outcomes in patients with Fuchs’


Emotional Impact of Diabetic Foot Ulcer

A. Manjula¹, Prasannababy², S J Nalini³, R Ramya⁴
¹Lecturer, Faculty of Nursing, ²Former Principal, Faculty of Nursing, ³Principal, Faculty of Nursing, ⁴Professor, Dept of General Surgery, Sri Ramachandra Medical College and Research Institute, (Deemed to be University), Porur, Chennai, Tamilnadu, India

ABSTRACT

A descriptive design was used to assess the emotional impact. The sample consisted of 20 patients with diabetic foot ulcer satisfying the sample selection criteria. The setting was surgical OPD of Sri Ramachandra Hospital. The instrument consisted of two parts Part I-demographic variables, Part II-emotional domain of diabetic foot ulcer scale developed by Johnson& Johnson (2002). Emotional domain that measures the level of depression consisted of 17 items in 5 point likert scale. Data were collected on the day of selection on a one to one basis through interview method. The study findings revealed that 10(50 %) patients belonged to the age group of 66-75yrs. Regarding wound classification, 14(70%) patients had ulcer that penetrated to capsule or bone. The emotional impact among diabetic foot ulcer patients were, 12(60%) patients had moderate depression and 6(20%) had mild depression and 2(10%) had severe depression. There is no statistically significant association noted between emotional impact and background variables.

Keywords: emotional impact; depression, diabetic foot ulcer.

INTRODUCTION

Diabetic foot ulcer is one of the long term complications of diabetes mellitus. Diabetic foot ulcers are the sores which develop over the feet. It is one of the common cause of amputation.85% of amputation are due to diabetic foot ulcer among patients with type 2 diabetes mellitus¹ and 20% of hospital admission in people with diabetes are due to foot ulcers² and average stay at hospital is 9-10 days³.

Advancement in health care facilities and treatment modalities have reduced mortality and extended the life expectancy of people. The long term treatment and deformity related to diabetic foot ulcer puts the individual in reduced social activities, increased family tension, limited employment, financial hardship⁴ ultimately makes the patient emotionally weak and finds it difficult to cope up with the situation. The emotional impact of diabetic foot ulcer is often overlooked when medical care is given importance. In the present study, the investigators assessed the emotional impact among patients with foot ulcer

STATEMENT OF THE PROBLEM

A Study to assess the emotional impact of foot ulcer among patients with diabetic foot ulcer at Sri Ramachandra hospital, Chennai.

OBJECTIVES OF THE STUDY:

To identify the emotional impact of foot ulcer among patients with diabetic foot ulcer.

To associate the emotional impact of foot ulcer with selected background variables among patients with diabetic foot ulcer.

METHODOLOGY

A.Materials and Methods:

Research design : Descriptive design

Setting: Surgical Outpatient Department of SRH.
**Population:** Patients with Diabetic Foot Ulcer  
**Sample size:** 20  
**Sampling technique:** Convenience sampling technique  
**Sampling criteria:**  
1. **Inclusion criteria**  
   a. Patients with diabetic foot ulcer for 4 weeks  
   b. Both male and female patients were included  
2. **Exclusion criteria**  
   a. Patients not volunteering to participate  
   b. Patients with known depression  

**Description of the instrument**  
**Part I** - Background variables: Age, gender, residence, educational status, duration of diabetes mellitus, glycemic control and wound classification.  
**Part II** - Emotional domain of diabetic foot ulcer scale developed by Johnson & Johnson (2002). Emotional domain that measures the level of depression consisted of 17 items in 5-point Likert scale, 1- not at all, 2- slightly, 3- moderately, 4- quite a bit, 5- extremely  

Score interpretation is given as  
<17 no depression  
18-34 mild depression  
35-51 moderate depression  
52-68 severe depression  
69-85 very severe depression  

**Data collection procedure**  
Ethical permission was obtained from Institutional Ethics Committee Ref no. (IEC-NI/13/APR/33/24). All the subjects satisfied the criteria were selected. The researcher approached each selected patient and explained the purpose and nature of the study. The patient’s consent was obtained individually and a one to one interview was conducted to obtain background information and identify emotional impact. 30 min was spent for each patient to collect the data.  

**Statistical analysis**  
Descriptive (Frequency, Percentage distribution, mean and standard deviation) and inferential (chi square) statistics were used.  

**RESULTS**  

Table 1. Frequency and Percentage Distribution of Background Variables among patients with Diabetic foot ulcer (N=20).  

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>DEMOGRAPHIC VARIABLES</th>
<th>FREQUENCY</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age (in years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) 36-45</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(b) 46-55</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>(c) 56-65</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>(d) 66-75</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>2.</td>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) Male</td>
<td>16</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>(b) Female</td>
<td>4</td>
<td>20</td>
</tr>
</tbody>
</table>
Cont... Table 1. Frequency and Percentage Distribution of Background Variables among patients with Diabetic foot ulcer (N=20).

<table>
<thead>
<tr>
<th>3. Residence</th>
<th>(a) Rural</th>
<th>8</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) Sub urban</td>
<td>6</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>(c) Urban</td>
<td>6</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Educational Status</th>
<th>(a) No formal education</th>
<th>3</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) Primary</td>
<td>8</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>(c) High school</td>
<td>6</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>(d) Higher secondary</td>
<td>3</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>(e) Collegiate</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Duration of diabetes mellitus</th>
<th>(a) &lt;1 year</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) 1-5 years</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>(c) 5-10 years</td>
<td>6</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>(d) &gt;10 years</td>
<td>14</td>
<td>70</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. Glycemic control</th>
<th>PPBS (mg/ dl)</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) &lt;250</td>
<td>4</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>b) 251-350</td>
<td>12</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>c) &gt;351</td>
<td>4</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. Wound classification</th>
<th>(a) IA</th>
<th>3</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) IIA</td>
<td>3</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>(c) IIIA</td>
<td>14</td>
<td>70</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 represents the frequency and percentage distribution of background variables. Majority, 10(50%) of the patients were between 66-75 yrs of age. With respect to gender 16(80%) were male. Maximum 8(40%) are from rural area. Majority of the patients educational status was primary school 8(40%). Regarding duration of diabetes mellitus 14(70%) has diabetes for more than 10yrs.

Table 2. Mean and standard deviation of Emotional Impact of diabetic foot ulcer among patients with diabetic foot ulcer (N=20).

<table>
<thead>
<tr>
<th>Si.no</th>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Emotional impact</td>
<td>39.35</td>
<td>10.68</td>
</tr>
</tbody>
</table>
Table 2 shows the mean emotional impact score as 39.35 with the SD 10.68.

**Table 3. Level of emotional impact of foot ulcer among patients with diabetic foot ulcer (N=20).**

<table>
<thead>
<tr>
<th>S.I no</th>
<th>Level of emotional impact</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Normal</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Mild depression</td>
<td>06</td>
<td>30</td>
</tr>
<tr>
<td>3.</td>
<td>Moderate depression</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>4.</td>
<td>Severe depression</td>
<td>02</td>
<td>10</td>
</tr>
<tr>
<td>5.</td>
<td>Very severe depression</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3 depicts the level of emotional impact, 12 (60%) patients have moderate depression and 2(10%) of patients have severe depression and 6 (30%) have mild depression.

**DISCUSSION**

Description of the study variables

Table 1 represents the frequency and percentage distribution of background variables. Majority, 10(50%) of the patients were between 66-75 yrs of age. With respect to gender 16(80%) were male. Maximum 8(40%) are from rural area. Majority of the patients educational status was primary school 8(40%). Regarding duration of diabetes mellitus 14(70%) has diabetes for more than 10yrs. Pengzi Zhang (2016) in is study on Global prevalence of diabetic foot ulcer the ulcer was found to be more prevalent in males, Type 2 Diabetes mellitus, older people and longer duration of diabetes.

The first objective of the study was to assess the emotional impact of foot ulcer among patients with diabetic foot ulcer.

The emotional impact of diabetic foot ulcer was assessed by using the Diabetic Foot Scale (DFS) developed by Johnson & Johnson (2002). Emotional domain that measures the level of depression consisted of 17 items in 5 point likert scale.

(Table 3) shows analysis of level of emotional impact, 12 (60%) patients have moderate depression and 2 (10%) of patients have severe depression. The study findings are consistent with the results of Maria Teresa de Jesus Pereira (2014) study were 50 patients with diabetic foot ulcer was studied for feelings of powerlessness using Powerlessness Assessment Tool for adults (PAT) with the mean total score 50.12. The results indicate that patients with diabetic foot ulcers had strong feelings of powerlessness.

(Table 2) shows the mean emotional impact score to be 39.35 with the SD 10.68.

The second objective of the study was to associate the level of emotional impact of foot ulcer with selected background variables among patients with diabetic foot ulcer.

There was no significant association found between the background variables.

**CONCLUSION**

Depression symptoms at various levels are present among most of the patients suffering from diabetic foot ulcer due to long term management, life style modification and recurrence of disease. Nurses need to play an important role in meeting the emotional needs of patients and help to lead a better quality of life.

**Conflict of Interest:** Conflict of interest declared none.

**Source of Funding:** Self

**Ethical Clearance:** Ethical permission was obtained from Institutional Ethics Committee (Sri Ramachandra institute of higher education and research, Deemed to be University).

**REFERENCES**


A Review of Epidemiology of Unintentional Injuries among Children in India

Alex Joseph¹, Dhasarathi Kumar², King David Edward²

¹Assistant Professor, School of Public Health, ²Research Assistant, School of Public Health, SRM Institute of Science and Technology, Chennai, Tamil Nadu.

ABSTRACT

Childhood injury is a major public health problem which requires immediate attention. According to the estimates of WHO, Injuries are of higher health concern in every country causing over 3.8 million deaths per year where Unintentional injuries account for almost 90% of these cases in Lower and middle income countries. Every year, approximately 875,000 children are killed and nonfatal injuries affect the lives of 10 to 30 million globally. In India, the mortality rate related to injuries among under-5 children is contributing to 5.9% of the total deaths. The objective of this study is to estimate the magnitude and prevalence of Unintentional injury distribution & pattern among children of 1-18 years of age in India. A thorough search was done using PUBMED, BMC PUBLIC HEALTH, IJPH, BMJ PAEDIATRICS and finally narrowing down to Pub Med where the articles published for the last ten years were extracted. The studies revealed that RTI, Burns, Falls, Drowning & Bites were the common causes and where meagre knowledge associated to the given injuries were significant influence to the pattern of Injury occurrence. Distribution & pattern of injury, including the health- seeking behaviour seemed to vary across both in Rural and Urban settings. Poor perception of injury was a common indicator of prevalence. Strategies on prevention and education still need improvisation. 90% of childhood injuries were both predictable and preventable. Unintentional injuries account for both the functional and financial healthcare burden on population under unintentional injury.

Keywords used: Injury in India, Unintentional injuries in India, Childhood injury in India, Childhood and Injuries.

INTRODUCTION

The perspective of some events never takes a better turn until there is more importance added to it by valuing that with something of historical origin. As we go on the same path we realize that Injury is not an unknown guest. This dates back more than a hundred years ago in England where a playful adventure of an 8-month-old turned to a tragic case of drowning.¹ Unintentional injuries are one of the leading causes of death and disability among children in most of the countries.² According to the baseline scenario of 2015, the deaths due to unintentional injuries are higher than the intentional injuries.³ Indirect estimates of WHO says Injuries are of higher health concern in every country causing over 3.9 million deaths per year where Unintentional injuries account for almost 90% of these cases in Lower and middle income countries, which show an emerging trend towards the rise of unintentional childhood injuries especially among the 0-14 years of age children. The commonly seen unintentional injuries are Road traffic injuries, fall, Burn, Drowning, Poison related injuries which may be due to ingestion of medication and chemical fluids. Each has its own numbers on prevalence data.²⁵

A growing child has little knowledge about its surrounding environment and this presents bigger chances of hazardous encounters. Each child is unique to every parent, whether they live in an undeveloped or the urban atmosphere. Child survival is important for the improvement of both national and international
child health. While presently available data exhibit increased frequency of cases in the rural population (north or the southern part of India), the number of hospital episodes continues to increase among the rural community. Where perceptions and treatment seeking behaviour are still a matter of high concern. This can be a major indicator of under-reported information, therefore, presenting a necessity for further investigation. Moreover, the psychosocial torment the family of the injured child goes through is unquantifiable. Another important part of this scenario is the financial burden and healthcare need that it inflicts. Disability adjusted life years (DALY) associated with unintentional injuries had indicated that there has been an increase in which proves to project greater chances of lifelong functional impairments and Disability. Studies affirm the facts that though hundreds of deaths occur due to injuries and/or violence, many millions suffer from non-fatal injuries according to injury prevention report of WHO. Distribution of the previously mentioned injuries is most prominent among males over female children.

Rationale: Though most of the injuries are preventable and predictable, there is a lack of social and political will to make a radical change in the incidence rate. While some of the studies provide evidence to the prevailing scenario in the northern part of the country the evolving epidemiological trend is still to improve in the southern side in better understanding the burden of the present issue that could provide a better picture which can help discover feasible interventions.

MATERIALS AND METHOD

The review initiated by a self-addressed guideline which helped the researcher set clearly defined rules as to the screening of studies.

Eligibility criteria: The inclusion criteria for selecting the studies was

1) Study was done in India,
2) Studies were only related to injuries, and
3) The participants were <18 years. The articles extracted were full-text from the last 10 years.

| MESH Terms | Exclusion criteria: Whereas violence-related injuries, International studies, Birth injuries, Studies that were addressing any birth defects or congenital abnormalities were rejected. Information sources: The review began with a web-based search on Google, to get a clearer picture of the available studies. Further exploration of evidence was carried out using PUBMED DATABASE, BMC PUBLIC HEALTH, AJPH, and BMJ PAEDIATRICS and was later restricted to the PUBMED DATABASE to maintain the integrity of the search and because of the availability of full-text papers. The given MESH terms were used to gather additional literature (Table1).

TABLE I: Mesh terms that were used to generate a search of articles

Rationale: Though most of the injuries are preventable and predictable, there is a lack of social and political will to make a radical change in the incidence rate. While some of the studies provide evidence to the prevailing scenario in the northern part of the country the evolving epidemiological trend is still to improve in the southern side in better understanding the burden of the present issue that could provide a better picture which can help discover feasible interventions.

MATERIALS AND METHOD

The review initiated by a self-addressed guideline which helped the researcher set clearly defined rules as to the screening of studies.

Eligibility criteria: The inclusion criteria for selecting the studies was

1) Study was done in India,
2) Studies were only related to injuries, and
3) The participants were <18 years. The articles extracted were full-text from the last 10 years.

There was heterogeneity of literature (including study designs and sample size) that was recorded in the review, so there were meagre reasons to perform any synthesis of quantitative information.

Exclusion criteria: Whereas violence-related injuries, International studies, Birth injuries, Studies that were addressing any birth defects or congenital abnormalities were rejected.

Information sources: The review began with a web-based search on Google, to get a clearer picture of the available studies. Further exploration of evidence was carried out using PUBMED DATABASE, BMC PUBLIC HEALTH, AJPH, and BMJ PAEDIATRICS and was later restricted to the PUBMED DATABASE to maintain the integrity of the search and because of the availability of full-text papers. The given MESH terms were used to gather additional literature (Table1).

TABLE I: Mesh terms that were used to generate a search of articles

<table>
<thead>
<tr>
<th>MESH Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wounds AND Unintentional Injuries (INDIA)</td>
</tr>
<tr>
<td>“Unintentional” AND (Childhood Injuries) NOT Intentional</td>
</tr>
<tr>
<td>“Childhood injuries” AND India</td>
</tr>
<tr>
<td>Unintentional Childhood Injuries AND India NOT Disability</td>
</tr>
<tr>
<td>Wounds AND Injuries (Unintentional injuries in INDIA) NOT Elderly</td>
</tr>
</tbody>
</table>

Risk of bias detection: Review articles for Unintentional injuries were also checked for any details on reliable evidence on estimates under Indian scenario. Further, the articles were screened using strobes checklist for observational studies as well as the Cochrane Collaboration’s tool also used for assessing risk of bias. Information regarding the quality of the papers was assessed exhibiting clarity in Inclusion/Exclusion criteria, study design, operational definitions (if any), sampling strategies and also the duration of each study.

Every study was also screened for ethical clearance by an Institutional review board or ethical committee, Informed consent (especially for community-based studies) and also whether the informant was a parent or caregiver.
RESULTS

Study selection: After the exhaustive search, the studies were narrowed down to only studies done in India, out of which 8 studies were selected. Thereon the Mesh terms (Table 1) were customized for an effective search strategy. The keywords were initially used to acquire the current literature with any unintentional injury study with several study designs. Studies using randomized controlled designs and case-control study design were excluded. The search result of each search strategy was recorded. The recurrences of some articles were observed to be more than once is any of the employed strategies and therefore those articles was included. This additionally determined the quality of the studies selected.

Synthesis of results: The overall prevalence of Unintentional injury in the selected studies among the age group of 1-18 years was observed around 7% to 23%. The common cause of injury was fall, followed by RTA and Burns. The minimum study duration was two months and the maximum duration is one year. A Study was done by Parameswaran had clearly mentioned sampling methodology including the derivation method that contrasts between both rural and urban-based study. These studies provided a better foundation which followed a discrete structure of information using analysis. Community-based studies had well defined operational definitions, sampling strategies, and sampling interval. Majority of the studies were done in the rural part of India. Some literature carried a rural community-based study covering households in villages and studies had defined operational definitions that addressed better clarity among each level of data collection. WHO TEACH-VIP 2 Guidelines were adopted by community- based studies to develop questionnaires for a survey on injuries. Certain studies have provided details regarding tools which were translated and back-translated and most of the study articles were cross-sectional designs. There was a lack of clarity of the statistical method used amongst substantial studies. Most of the literature contains analysis done using statistical package SPSS or EPI Info followed by STATA. Studies included used Chi-square analysis followed by other studies with only descriptive and frequencies. Most of the unintentional injuries seemed to occur during daytime.

A Study done by Bhandari extracted basic information like demographic details alongside other information on injury by activity, severity and equipment-related injury and observed the difference in distribution of frequency of cases among male gender than females except for study done by Bhuvaneshwari which shows that females getting injured over males was significantly higher, the common injury being Falls. Another study done by Inbaraj showed that 89.3% of the children with primary caregivers had a higher rate of injury as compared to mothers as caregivers. Further adding that most of the Unintentional injuries fall between 0 to 14 years. The home was the most common place of injury especially in the summer and Sivamani highlighted an effective method of validation (Lincoln Peterson capture-recapture) that ensured complete coverage of household survey data. A meagre amount of households refused to give consent. The studies included had One year as recall period of any unintentional injury.

DISCUSSION

Literature shows that the trend of unintentional injuries needs a significant attention and research especially from the caregiver point of view. In many situation the unintentional injuries goes unnoticeably. There is still demand high quality study, because quality study will to help provide a wider picture and the true incidence of injuries. The health-related quality of life is very poor, especially among children. It could be an iceberg phenomenon that health research could assist within gathering evidence for more interventions, and these measures can create a need for longitudinal studies. Present status has proven that surveillance has effective strategy to prevent child injury, the Haddon’s Matrix model will help to understand prevention of unintentional injuries. The current community-based studies show that there is an increase in cases and a decrease of case reporting in community, where case reporting is also importance. Institutional based studies are sometimes lacking in essential information, even if it’s a minor injury and still, it requiring extra attention. The quality of community-based studies proves to be an actual picture of a current situation. The integration of child health programmes in prevention strategies would provide a sustainable result on reducing injuries. Overall there are certain individual risk factors and other social and physical factors which may changes over time, resulting in the distribution of prevention strategies and risk
factors in low and middle-income countries (LMIC) due to globalization. The use of geospatial methods, like mapping, to understand the epidemiology is also help to estimating what is the present magnitude and pattern of occurrence of unintentional injuries in identifying priority areas. These types of approaches may help to produce the validated research findings.

CONCLUSION

A safer home environment for a child should be available at every household. Most of the unintentional injuries are preventable rather than accidental. It is still predictable and therefore preventable rather than inevitable. The community needs more awareness of the effects of unintentional injuries among children so that could help to make a better policy. Most of the evidence is either missing or they are lack of manpower to document any such epidemiological data, leading to undermining the quality of research.

Conflict of Interest: None.

Source of Funding: Indian Council of Medical Research, IRIS No; 2013-1275.

Ethical Clearance: Not Applicable

REFERENCE


Study of Socio-Demographic Factors Affecting Infant Feeding Practices in an Urban Area of Punjab

Amanpreet Kaur¹, Jagdeep Singh², Harpreet Kaur³, Harpreet Kaur⁴, Priyanka Devgun⁵

¹Associate Professor, ²Assistant Professor, Department of Medicine, SGRDIMSA, Amritsar,
³Professor, ⁴Statistician cum Lecturer, ⁵Professor & Head Department of Community Medicine,
SGRDIMSAR, Amritsar

ABSTRACT

Background: Optimal infant and young child feeding practices rank among the most effective interventions to improve child health. Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants; it is also an integral part of the reproductive process with important implications for the health of mothers. Many factors affect the feeding practices including education of mother, awareness about the benefits of breastfeeding. So this study was done to know the factors affecting the infant feeding practices.

Material and Method: A cross-sectional study was conducted in the urban field practice area of the Department of Community Medicine of SGRD Institute of Medical Sciences and Research, Amritsar. All the mothers of infants were included in the study. House to house survey was done to collect information about demographic profile, feeding practices and socio cultural factors affecting the feeding practices.

Results: It was observed that 53.7% mothers started breast feeding next day, 30.4% mothers started breast feeding the same day and 16% started breast feeding immediately. Pre lacteal feed was given by most of the mothers (89.5%). The common pre lacteal feed given was honey (67.3%). The colostrum was given by 59.1% of mothers. Weaning after 6 months was started by 53.3% mothers while 46.7% started after 4 months. Education had a significant association with age at weaning (p=0.018).

Conclusion: The present study revealed that various inappropriate feeding practices are prevalent in the community. Health and nutrition programmes should be concentrated on counselling of the mothers regarding breastfeeding especially exclusive breastfeeding.

Keywords: Feeding, Infant, mother

INTRODUCTION

Optimal infant and young child feeding practices rank among the most effective interventions to improve child health. In 2006 an estimated 9.5 million children died before their fifth birthday, and two thirds of these deaths occurred in the first year of life. Under-nutrition is associated with at least 35% of child deaths. It is also a major disabler preventing children who survive from reaching their full developmental potential. It is estimated that sub-optimal breastfeeding, especially non-exclusive breastfeeding in the first 6 months of life, results in 1.4 million deaths and 10% of the disease burden in children younger than 5 years.¹

Adequate nutrition during infancy and early childhood is fundamental to the development of each child’s full human potential. It is well recognized that the period from birth to two years of age is a “critical window” for the promotion of optimal growth, health and behavioral development. Longitudinal studies have consistently shown that this is the peak age for growth faltering, deficiencies of certain micronutrients, and common childhood illnesses such as diarrhea.²
Efforts to promote modest nutritional improvements such as changes in feeding behaviour will have a beneficial impact on mortality rates over time. Feeding practices adopted by mothers depend on the knowledge, attitude, socio-cultural tradition they are exposed to.\textsuperscript{3}

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants; it is also an integral part of the reproductive process with important implications for the health of mothers. Review of evidence has shown that, on a population basis, exclusive breastfeeding for 6 months is the optimal way of feeding infants. Thereafter infants should receive complementary foods with continued breastfeeding up to 2 years of age or beyond.\textsuperscript{4}

Despite the many benefits of EBF, sound breastfeeding practices are not the norm in many countries, and large differences exist in the EBF rates between regions and among countries. The promotion, support and protection of optimum breastfeeding take a different type of engagement from the health system, because breastfeeding is a social behaviour and not a medical practice. It is not a typical intervention, because there is no pharmaceutical product to be purchased or distributed and the practice is not dependent on a facility or health provider. These factors pose particular challenges, which have been addressed with varying degrees of success by breastfeeding programmes.\textsuperscript{5}

According to DLHS 4 in Punjab, 56.4% of Children age 0-5 months are exclusively breastfed and 74.4% of Children age 6-9 months are receiving solid/semi-solid food and breast milk.\textsuperscript{6}

Many factors affect the feeding practices including education of mother, awareness about the benefits of breastfeeding. So this study was done to know the factors affecting the infant feeding practices.

**MATERIAL AND METHOD**

A cross-sectional study was conducted in the urban field practice area of the Department of Community Medicine of SGRD Institute of Medical Sciences and Research from April to June 2014. The mothers of infants were included in the study. A pre-designed and pre tested questionnaire was used to collect the information. Verbal consent was taken from the mothers after explaining the purpose of the study. Out of 263 mothers 257 were willing to participate in the study. House to house survey was done to collect information about demographic profile, feeding practices and socio cultural factors affecting the feeding practices. Statistical analysis was done by using SPSS 20.0.

**RESULTS**

It was a cross-sectional study conducted in the field practice area of Community Medicine, SRDIMSAR, Amritsar. There were total 263 infants in the area. The mothers of these infants were contacted. Out of 263 mothers, 257 gave consent to participate in the study. Most of the mothers were in the age group of 25-30 years. 19.8% of mothers were illiterate and rest were literate up to different levels a shown in table. 87.9% were housewives. Education profile of the fathers revealed that 55.6% were educated up to matric, 26.8% up to middle school, 13.6% above matric and only 10 (3.9%) were illiterate. Majority of the fathers (61.9%) were semiskilled workers, 30.7% were skilled and 7.4% were unskilled workers (Table I).

There were 138 (53.7%) male and 119 (46.3%) female children. Out of total children, 56.4% belonged to joint family and 43.6% children were from nuclear family. Majority of the children (87.2%) were Sikh by religion and 12.8% were Hindus. It was observed that 45.9% mothers had one, 33.1% had two, 14.8% had three and 6.2% had four living children respectively. Immunization status of 87.2% children was complete till date.

While all the mothers started breast feeding their child after birth, 80.2% mothers were still practicing breast feeding at the time of study. It was observed that 53.7% mothers started breast feeding next day, 30.4% mothers started breast feeding the same day and 16% started breast feeding immediately. The most common reason for delay in breast feeding was due to no milk secretion (58.8%), followed by caesarean section (26.1%), traditional practice (10.9%), baby asleep (2.3%) and mother tired (1.9%) respectively.

Pre lacteal feed was given by most of the mothers (89.5%). The common pre lacteal feed given was honey (67.3%). The colostrum was given by 59.1% of mothers while 40.9% discarded the colostrum. The most common reason for not giving colostrums was caesarian section (26.1%), traditional practice (10.9%), baby asleep (2.3%) and mother tired (1.9%) respectively.
children, while 10.1, 6.6, 13.2 and 1.2% were fed after every 4h, 3 h, 2 h and 1 h respectively.

There was significant association between educational status of mother and initiation of breastfeeding (p<0.018). Only 62.6% mothers knew about exclusive breastfeeding. There was significant association between education status of mother and knowledge of exclusive breastfeeding (p=.047). Weaning after 6 months was started by 53.3% mothers while 46.7% started after 4 months. Education had a significant association with age at weaning (p=0.018). 101 (39.3%) mothers used bottle along with breastfeed to feed their children

**Table No: 1Socio-Demographic Profile of Respondents**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of mothers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-25</td>
<td>67</td>
<td>26.1</td>
</tr>
<tr>
<td>25-30</td>
<td>133</td>
<td>51.8</td>
</tr>
<tr>
<td>30-35</td>
<td>52</td>
<td>20.2</td>
</tr>
<tr>
<td>&gt;35</td>
<td>5</td>
<td>1.9</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sikh</td>
<td>224</td>
<td>87.2</td>
</tr>
<tr>
<td>Hindu</td>
<td>33</td>
<td>12.8</td>
</tr>
<tr>
<td>Type of Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td>112</td>
<td>43.6</td>
</tr>
<tr>
<td>Joint</td>
<td>145</td>
<td>56.4</td>
</tr>
<tr>
<td>Literacy Status of mother</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>51</td>
<td>19.8</td>
</tr>
<tr>
<td>Middle</td>
<td>98</td>
<td>38.1</td>
</tr>
<tr>
<td>Matric</td>
<td>54</td>
<td>21.0</td>
</tr>
<tr>
<td>Above matric</td>
<td>54</td>
<td>21.0</td>
</tr>
<tr>
<td>Literacy status of Father</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>10</td>
<td>3.9</td>
</tr>
<tr>
<td>Middle</td>
<td>69</td>
<td>26.8</td>
</tr>
<tr>
<td>Matric</td>
<td>143</td>
<td>55.6</td>
</tr>
<tr>
<td>Above Matric</td>
<td>35</td>
<td>13.6</td>
</tr>
<tr>
<td>Occupation of mother</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>226</td>
<td>87.9</td>
</tr>
<tr>
<td>Working Outside</td>
<td>31</td>
<td>12.1</td>
</tr>
<tr>
<td>No. of Living Children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>118</td>
<td>45.9</td>
</tr>
<tr>
<td>2</td>
<td>85</td>
<td>33.1</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>14.8</td>
</tr>
<tr>
<td>≥4</td>
<td>16</td>
<td>6.2</td>
</tr>
</tbody>
</table>
**Table No: 2  Relation of Education with Feeding Practices**

<table>
<thead>
<tr>
<th>Practices evaluated</th>
<th>Education</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Illiterate</td>
<td>Up to Middle school</td>
<td>Up to matric</td>
<td>Above matric</td>
</tr>
<tr>
<td>Initiation of breast feeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>within 1 hr</td>
<td>7</td>
<td>12</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>same day</td>
<td>12</td>
<td>37</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>next day</td>
<td>32</td>
<td>49</td>
<td>35</td>
<td>22</td>
</tr>
<tr>
<td>Chi-square = 15.35,</td>
<td>df = 6,</td>
<td>p = 0.018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottle feeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33</td>
<td>33</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>65</td>
<td>40</td>
<td>33</td>
</tr>
<tr>
<td>Chi-square = 19.153,</td>
<td>df = 3,</td>
<td>p = 0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weaning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 4 months</td>
<td>25</td>
<td>30</td>
<td>27</td>
<td>38</td>
</tr>
<tr>
<td>After 6 months</td>
<td>26</td>
<td>68</td>
<td>27</td>
<td>16</td>
</tr>
<tr>
<td>Chi-square = 15.35,</td>
<td>df = 6,</td>
<td>p = 0.018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge on exclusive breastfeeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>29</td>
<td>72</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>No</td>
<td>22</td>
<td>26</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Chi-square = 7.95,</td>
<td>df = 3,</td>
<td>p = 0.047</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DISCUSSION**

The study was done among the infant mothers. Most of the mothers were in the age group of 25-30 years. Similarly in a study conducted in rural area of Karnataka most of the females (60%) belonged to age group of 21-25 years. 19.8% of mothers were illiterate and rest were literate up to different levels a shown in table. 87.9% were housewives.

There were 138 (53.7%) male and 119 (46.3%) female children. Out of total children, 56.4% belonged to joint family and 43.6% children were from nuclear family. Majority of the children (87.2%) were Sikh by religion and 12.8% were Hindus. It was observed that 45.9% mothers had one, 33.1% had two, 14.8% had three and 6.2% had four living children respectively. Immunization status of 87.2% children was complete till date.

While all the mothers started breast feeding their child after birth, 80.2% mothers were still practicing breast feeding at the time of study. It was observed that 53.7% mothers started breast feeding next day, 30.4% mothers started breast feeding the same day and 16% started breast feeding immediately. This is in contrast to the findings of study done among postnatal women in Southern India where 61% of mothers started breastfeeding within 1 hour. The most common reason for delay in breast feeding was due to no milk secretion (58.8%), followed by caesarean section (26.1%), traditional practice (10.9%), baby asleep (2.3%) and mother tires (1.9%) respectively. In a study done in Meerut, among those (79.5%) who initiated breast feeding late, the most common reason was social custom and belief (52.8%). Other reasons were mother and baby illness (41.2%), breast milk insufficiency (4.4%) and difficulty of infant to attach to breast (1.6%).

Pre lacteal feed was given by most of the mothers (89.5%). The common pre lacteal feed given was honey (67.3%). In a study done in Warangal, Telangana Prelacteal feed was given in 57% out of which 51.1% were given honey with fingers. The colostrum was given by 59.1% of mothers. The most common reason for not giving colostrums was cesarian section in 45.7% of mothers, while in 38.09% of mothers it was no milk secretion.
and 16.19% thought it is harmful for the baby. Feeding on demand was practised in 68.9% children. In a study done in a rural area of Puducherry demand feeding was practiced by 80.1% of mothers.\(^\text{11}\)

Only 62.6% mothers knew about exclusive breastfeeding. There was significant association between education status of mother and knowledge of exclusive breastfeeding (p = .047). Weaning after 6 months was started by 53.3% mothers while 46.7% started after 4 months. Preferred food for weaning was homemade in 89.5% of mothers while in 10.5% it was ready to cook food. Similarly in a study done in rural Delhi, breast milk plus semisolids were being given to 65.1% infants 6-9 months of age. Homemade semisolids were more popular (72.6%) than commercial ones (24.5%).\(^\text{12}\) 39.3% mothers used bottle along with breastfeed to feed their children.

**CONCLUSION**

The present study revealed that various inappropriate feeding practices are prevalent in the community. Delayed initiation of breastfeeding, deprivation from colostrum and improper complementary feeding are practiced and this lead to under nutrition in children. Knowledge of mother, traditions, socioeconomic level of the family affects the feeding practices. Health and nutrition programmes should be concentrated on counselling of the mothers regarding breastfeeding especially exclusive breastfeeding.

**Funding:** No funding source

**Conflict of Interest:** None

**Ethical approval:** The study was approved by the Institutional Ethics Committee.

**REFERENCES**

1. Infant and young child feeding. WHO. Available at [http://www.wpro.who.int/nutrition_wpr/publications/infantchildfeeding.pdf](http://www.wpro.who.int/nutrition_wpr/publications/infantchildfeeding.pdf).


On the Structure of Infant Mortality using Accelerated Failure Time (AFT) Model: A Comparative Study based on National Family Health Survey (NFHS) Data in India

Anu Sirohi¹, Piyush Kant Rai²

¹Research Scholar, Department of Mathematics and Statistics, Banasthali Vidyapith, Rajasthan, India, ²Associate Professor, Department of Statistics, Banaras Hindu University, Uttar Pradesh, India

ABSTRACT

This paper analyzes the effect of socioeconomic and demographic factors on infant mortality in India. The paper also examines reasonable comparison of the three National Family Health Survey (NFHS), the largest sample survey of India from the 1993-1994, 1998-1999 and 2005-06 with respect to different determinants of infant mortality. Accelerated Failure Time (AFT) model is used to measure the direct effect of the above factors on the survival of infants. On the basis of Akaike’s Information Criterion (AIC), the Weibull AFT model fits better to other selected models. In all the three NFHS, Weibull AFT model shows the significant effect of the factors on infant survival.

Keywords: Infant mortality, determinants of infant mortality, NFHS, Cox proportional hazard model, AFT model

INTRODUCTION

Study about infant mortality rate as a measure of infant death and its pattern recognition play a crucial role of health status scenario for any nation as infant mortality rate is widely accepted and longstanding indicator of well-being of children. In this perspective the infant mortality rate is an important indicator of a country’s financial welfare too. The infant mortality rate is defined as the number of infant death among 1000 live births during the first year of life. The study about infant of a country is one of the main focus for the planners of the country. In 2015, 4.5 million deaths occurred in the infancy period (WHO, report). Infant mortality rate is high in developing countries like India, as compared to developed countries. India has experienced an impressive decline in infant death during the previous two decades but, it is still high as compared to other developed countries.

Thus, study of the overall picture of the survival of infant “Survival Analysis” provides the platform to move further in the same line. Survival analysis is defined as a collection of methods for analyzing the data where the response variable is time until the occurrence of death of infant. The field of survival analysis experienced tremendous growth during the latter half of the 20th century. The most profound methodologies so developed are Kaplan-Meier (non-parametric survival method) used to estimate the survival function (i.e. probability that an infant survive beyond a given time), and the Cox proportional hazard model (semi-parametric method) to examine the covariate effects on the hazard function (i.e. risk of death, in an interval after a specified time, condition on the subject having survived to that specified time).

Various studies on the basis of these models have been done, such as unsupplemented breastfeeding is more strongly associated with fewer infant deaths than supplemented breastfeeding. In Egypt, the effect of household income on infant and early childhood mortality at household level is studied by incorporating the socioeconomic and demographic variables. An attempt has been made to examine the impact of breastfeeding and maternal health care programs on infant mortality corresponding to other socio-demographic variables. It is also essential to study the behavior of infant deaths in developing countries like India and determine the effect of demographic and socioeconomic factors on infant mortality.

Although the Cox-proportional hazard model finds widespread applicability in the survival analysis, it holds...
some assumptions such as the regression coefficient is constant over time (proportional hazard assumption), combination of the covariates is linear and link function is exponential. Proportional hazard (PH) assumption received most attention in research and applications as well. Most research often ignored and not checked the assumption of proportional hazard that makes the result’s accuracy questionable. Our study tests the assumption of proportional hazard on the basis of schoenfeld residuals and reaches to conclusion that the PH assumption is not fulfill. Therefore Cox-PH model could not be applied to test the effect of different covariates on the survival of infants. Thus, in this situation Accelerated Failure Time (AFT) model is a good alternative over these models, which relaxes the PH assumptions. AFT model is a parametric survival model used to see the pattern of the survival time of infants corresponding to different covariates. AFT models measure the direct effect of the explanatory variables on the survival time instead of hazard in Cox-PH models. This characteristic of AFT model makes easy interpretation of the results, because parameter measures the effect of corresponding variable on the mean of survival time.

**DATA AND METHODOLOGY**

The National Family Health Survey (NFHS) was carried out as the principal activity of a collaborative project to strengthen the research capabilities of the Population Research Centers in India, initiated by the Ministry of Health and Family Welfare, Government of India, and coordinated by the International Institute of Population Science (IIPS) Mumbai. There have been four rounds of the survey conducted, during 1992-93 (NFHS I), 1998-99 (NFHS II), 2005-06 (NFHS III) and in 2015-16 (NFHS IV) but, till now information on fourth round is not available. The main objective of the NFHS survey is to provide reliable and up-to-date information on various demographic events and their estimates for a comprehensive portrait of population, health, and nutrition in India as well as in each of its states. This paper utilizes three NFHS’s (NFHS I, NFHS II and NFHS III) for the survival analysis.

AFT model is used to see the association of survival time of infants with covariates. For a random time to event \( T_i \) an AFT model proposes the following relationship between explanatory variables and \( Y_i = \log T_i \).

\[
Y_i = \mu + \alpha_1 x_{i1} + \alpha_2 x_{i2} + \cdots + \alpha_j x_{ij} + \cdots + \alpha_k x_{ki} + \sigma \epsilon_i
\]

where \( \mu \) is intercept term, \( x_{ij} \) is the value of the \( j \)th explanatory variable, \( j = 1, 2, \ldots, k \), for the \( i \)th individual, \( i = 1, 2, \ldots, n \), \( \sigma \) is the scale parameter and \( \epsilon_i \) is a random variable assume to have particular distribution. On the basis of this relationship survival function at time \( t \) is defined as,

\[
S_i(t) = P(T_i \geq t)
\]

\[
S_i(t) = P[\exp(\mu + \varphi x_i + \sigma \epsilon_i) \geq t],
\]

where

\[
\varphi x_i = \alpha_1 x_{i1} + \alpha_2 x_{i2} + \cdots + \alpha_k x_{ki}
\]

Now \( S_i(t) \), can be written in the form,

\[
S_i(t) = P \left[ \exp(\mu + \sigma \epsilon_i) \geq \frac{t}{\exp(\varphi x_i)} \right]
\]

\[
S_i(t) = S_0 \left[ \frac{t}{\exp(\varphi x_i)} \right]
\]

where \( S_0(t) \) is the baseline survival function i.e. the survivor function of an individual at \( x_i = 0 \). \( \exp(-\varphi x_i) \) is said to be the acceleration factor (\( \gamma \)) for the \( ith \) individual.
RESULTS

The survey included 11047, 7345 and 8301 live births in NFHS I, II and III respectively. Out of complete information, 2053 (18%), 975 (13%) and 1595 (19%) deaths have been occurred in the respective NFHS. Among the live births, 5672 (5372), 3862 (3483), 4245 (4056) were male (female) and proportion of infants belonging to rural area was 76% in NFHS I and II while this proportion was 66% in NFHS III. 66%, 53% and 48% infants were those whose mothers were not educated in the three surveys. 15% of infants were not breastfed in NFHS I and III, while this proportion was 12% in NFHS II.

Table 1, shows the results of global Schoenfeld test regarding to NFHS I, II, & III which was used to test the independence between time and Schoenfeld residuals. An insignificant relationship between residuals and time supports the proportional hazard assumption. Breastfeeding, mother education, birth order and place of delivery have shown a significant relationship between residuals and time in all three NFHS. Global test was also significant which means that the proportional hazard assumption not met in whole the model. Results of Table 1, summarizes that the Cox-proportional hazard model could not be applied for infant mortality. Alternative approach of Cox-proportional hazard model i.e. AFT model was used which relaxed this assumption but required to determine the probability distribution of data set. Weibull versus exponential versus logistic were proposed distributions for the study. The selection of the distribution was done on the basis of Akaike’s information criterion (AIC). Table 2, shows AIC value of different AFT models corresponding to each NFHS and it was minimum for the Weibull distribution. Therefore, this study included Weibull AFT models to study the effect of different covariates on infant survival.

Figure 1, which was based on NFHS I data, illustrates that the survival curve was highest for the infants who were breastfed, lower for the first and fourth order birth, higher when mother delivered their child in private hospital, lower for the infants whose mothers were not educated, higher for the infants who were born in first four years of marriage span of their parents, lower for the infants who came from small family size (i.e. 1-3 members in the household) as compared to other categories. Figure 2 and 3, show that the infant survival curves in NFHS II and III, have quite similar pattern as NFHS I.

In this study AFT model included nine covariates (breastfeeding, mother age, mother education, place of delivery, sex of infant, place of residence, marital status, birth order and family size) to see the effect of these covariates on the survival of infants regarding to each NFHS. Table 3, shows the results of AFT model on the basis of NFHS I, II and III data. Firstly, we will discuss the results of AFT Model related to NFHS I data. On the basis of these results, survival time for the infants who were breastfed was significantly increased by the factor 41.674 as compared to the infant who were not breastfed. Risk of death was high for first birth order and significantly decreased two times in second birth order as compared to the first. Survival of Infants having mother age 30-34 years was strong and significantly increased 1.519 times as compared to the infants of mother age 15-18 years. Survival of infant was high in the category where mother belonged to the secondary and higher level group of education and increased by 2.125 times as compared to the infant whose mother was not educated. Survival of infants who were born in a private hospital was significantly increased nearly three times as compared to the infant who were born at home. Survival time of infant where the duration of the parents marriage was 5-9 years and more than 9 years was significantly decreased by the factor 0.362 and 0.282 times respectively as compared to early married couple (0 – 4 years of parents marriage). Survival of the infant who belonged to family size of 4-6 members was significantly increased 1.5 times as compared to the infants who belonged to small family size of 1 – 3 members. Survival of the infant who belonged to the urban area was significantly better than the infant of rural area and also better for female child as compared to the male child. Behavior of AFT model related to NFHS II and III data was similar to NFHS I data except some significant results, which are discussed in the next section.

Discussion and Comparison among NFHS’s

In all three NFHS, survival of infants was highly increased, where they were breastfed, even in the presence of control for several other demographic factors. Breast milk is nature’s perfect food for the baby and it contains immunity boosting antibodies and healthy enzymes. Finding is consistent with the
finding from other authors\textsuperscript{6,8}. In NFHS II, delivery in government hospital was not significantly associated with infant survival, while in NFHS I and III, survival of infants significantly increased when delivery took place in a government hospital as compared to home. In NFHS I and III, survival of female child was significantly increased, but in NFHS II it was not significant may be because of less careness, social taboos among the other reasons. Survival of infant belonged to small family size was decreased in each NFHS as compared to big family size. Small family does not have proper required care to infant may be one reason for less survival. Joint families have lower risk of infant mortality as compared to nuclear families\textsuperscript{4}.

Rural area has significantly poor survival of infants as compared to urban areas and this pattern was similar in all three NFHS. It means that till NFHS III there was no sufficient development of health improvement conditions as required in rural areas. Survival of infants significantly increased for those who were born from early married couples, may be due to the decrement of fertility in women after a fix period of time. Survival of infant of mother age 15 – 18 years was significantly decreased in NFHS I and II, but in NFHS III, result was not significant may be due to the medical awareness in the population. In all three NFHS, survival of infants significantly increased, when mothers were highly educated as compared to uneducated mothers. The educated mothers have better knowledge of health care facilities. They are expected to live in healthy environment and take more nutritious food. Maternal education results into rising the age at marriage, enhances socioeconomic status and emphasis on child quality\textsuperscript{3} and hence reduces the risk of death in infancy.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure1.png}
\caption{Parametric Survival Curves for NFHS I}
\end{figure}

\textbf{Note}: B.F.: Breastfeeding
B.O.: Birth Order
M.Edu.: Mother Education
F.S.: Family Size
Govt. Hosp.: Government Hospital
Prvt. Hosp.: Private Hospital
M.S.: Marital Status
Figure 2: Parametric Survival Curves for NFHS II
Figure 3: Parametric Survival Curves for NFHS III
Table 1: Global Schoenfeld test for NFHS I, II & III data

<table>
<thead>
<tr>
<th>Covariates</th>
<th>$\chi^2$ NFHS I</th>
<th>p-value NFHS I</th>
<th>$\chi^2$ NFHS II</th>
<th>p-value NFHS II</th>
<th>$\chi^2$ NFHS III</th>
<th>p-value NFHS III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding</td>
<td>9.091</td>
<td>0.003</td>
<td>5.300</td>
<td>0.021</td>
<td>9.753</td>
<td>0.002</td>
</tr>
<tr>
<td>Mother age</td>
<td>0.372</td>
<td>0.542</td>
<td>1.090</td>
<td>0.296</td>
<td>0.6412</td>
<td>0.423</td>
</tr>
<tr>
<td>Sex</td>
<td>2.868</td>
<td>0.090</td>
<td>3.460</td>
<td>0.063</td>
<td>3.3803</td>
<td>0.066</td>
</tr>
<tr>
<td>Mother education</td>
<td>10.239</td>
<td>0.001</td>
<td>5.870</td>
<td>0.015</td>
<td>8.572</td>
<td>0.003</td>
</tr>
<tr>
<td>Birth Order</td>
<td>14.072</td>
<td>0.000</td>
<td>3.170</td>
<td>0.075</td>
<td>6.0943</td>
<td>0.014</td>
</tr>
<tr>
<td>Place of delivery</td>
<td>22.305</td>
<td>0.000</td>
<td>19.000</td>
<td>0.000</td>
<td>31.621</td>
<td>0.000</td>
</tr>
<tr>
<td>Place of residence</td>
<td>0.28</td>
<td>0.597</td>
<td>2.210</td>
<td>0.137</td>
<td>1.9197</td>
<td>0.166</td>
</tr>
<tr>
<td>Marital Status</td>
<td>0.221</td>
<td>0.638</td>
<td>1.140</td>
<td>0.285</td>
<td>0.0263</td>
<td>0.871</td>
</tr>
<tr>
<td>Family size</td>
<td>1.188</td>
<td>0.276</td>
<td>0.000</td>
<td>0.989</td>
<td>3.3707</td>
<td>0.066</td>
</tr>
<tr>
<td>GLOBAL</td>
<td>116.169</td>
<td>0.000</td>
<td>94.000</td>
<td>0.000</td>
<td>130.1486</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 2: AIC values for different Distribution

<table>
<thead>
<tr>
<th>Models</th>
<th>AIC Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFHS I</td>
<td>Weibull</td>
</tr>
<tr>
<td></td>
<td>Exponential</td>
</tr>
<tr>
<td></td>
<td>Logistic</td>
</tr>
<tr>
<td>NFHS II</td>
<td>Weibull</td>
</tr>
<tr>
<td></td>
<td>Exponential</td>
</tr>
<tr>
<td></td>
<td>Logistic</td>
</tr>
<tr>
<td>NFHS III</td>
<td>Weibull</td>
</tr>
<tr>
<td></td>
<td>Exponential</td>
</tr>
<tr>
<td></td>
<td>Logistic</td>
</tr>
</tbody>
</table>

Table 3: Summary Statistics of AFT Model for NFHS I, II & III

<table>
<thead>
<tr>
<th>Covariates</th>
<th>p-value NFHS I</th>
<th>$Y$ NFHS I</th>
<th>p-value NFHS II</th>
<th>$Y$ NFHS II</th>
<th>p-value NFHS III</th>
<th>$Y$ NFHS III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.000</td>
<td>1.594</td>
<td>0.000</td>
<td>1.599</td>
<td>0.000</td>
<td>2.404</td>
</tr>
<tr>
<td>Breastfeeding</td>
<td>0.000</td>
<td>41.674</td>
<td>0.000</td>
<td>132.687</td>
<td>0.000</td>
<td>41.720</td>
</tr>
<tr>
<td>Mother Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 – 18</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>19 – 24</td>
<td>0.022</td>
<td>1.230</td>
<td>0.322</td>
<td>1.124</td>
<td>0.621</td>
<td>0.939</td>
</tr>
<tr>
<td>25 – 29</td>
<td>0.003</td>
<td>1.383</td>
<td>0.002</td>
<td>1.930</td>
<td>0.528</td>
<td>1.094</td>
</tr>
<tr>
<td>30 – 34</td>
<td>0.002</td>
<td>1.519</td>
<td>0.064</td>
<td>1.317</td>
<td>0.465</td>
<td>1.129</td>
</tr>
<tr>
<td>35 and more</td>
<td>0.017</td>
<td>1.459</td>
<td>0.014</td>
<td>3.724</td>
<td>0.979</td>
<td>1.005</td>
</tr>
<tr>
<td>Mother Education</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No Education*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
### Table 3: Summary Statistics of AFT Model for NFHS I, II & III

<table>
<thead>
<tr>
<th></th>
<th>0.152</th>
<th>1.121</th>
<th>0.004</th>
<th>1.368</th>
<th>0.439</th>
<th>1.074</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>0.000</td>
<td>2.125</td>
<td>0.000</td>
<td>2.157</td>
<td>0.000</td>
<td>2.266</td>
</tr>
<tr>
<td>Secondary or Higher level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth Order</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>0.000</td>
<td>2.139</td>
<td>0.588</td>
<td>0.941</td>
<td>0.000</td>
<td>2.863</td>
</tr>
<tr>
<td>3</td>
<td>0.000</td>
<td>2.842</td>
<td>0.205</td>
<td>1.202</td>
<td>0.000</td>
<td>4.293</td>
</tr>
<tr>
<td>4 and more</td>
<td>0.000</td>
<td>2.702</td>
<td>0.032</td>
<td>1.416</td>
<td>0.000</td>
<td>3.551</td>
</tr>
<tr>
<td>Place of Delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Govt. Hospital</td>
<td>0.006</td>
<td>1.266</td>
<td>0.149</td>
<td>1.175</td>
<td>0.004</td>
<td>1.308</td>
</tr>
<tr>
<td>Private Hospital</td>
<td>0.000</td>
<td>2.981</td>
<td>0.000</td>
<td>1.771</td>
<td>0.000</td>
<td>1.417</td>
</tr>
<tr>
<td>Other</td>
<td>0.054</td>
<td>0.404</td>
<td>0.763</td>
<td>1.192</td>
<td>0.397</td>
<td>0.704</td>
</tr>
<tr>
<td>Place of Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Urban</td>
<td>0.000</td>
<td>1.367</td>
<td>0.000</td>
<td>1.499</td>
<td>0.000</td>
<td>1.457</td>
</tr>
<tr>
<td>Sex</td>
<td>0.000</td>
<td>1.309</td>
<td>0.125</td>
<td>1.127</td>
<td>0.001</td>
<td>1.233</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5 – 9</td>
<td>0.000</td>
<td>0.363</td>
<td>0.091</td>
<td>0.818</td>
<td>0.000</td>
<td>0.186</td>
</tr>
<tr>
<td>10 and more</td>
<td>0.000</td>
<td>0.282</td>
<td>0.003</td>
<td>0.592</td>
<td>0.000</td>
<td>0.157</td>
</tr>
<tr>
<td>Family Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4 – 6</td>
<td>0.000</td>
<td>1.427</td>
<td>0.000</td>
<td>1.503</td>
<td>0.023</td>
<td>1.245</td>
</tr>
<tr>
<td>7 and more</td>
<td>0.000</td>
<td>1.725</td>
<td>0.000</td>
<td>1.484</td>
<td>0.000</td>
<td>1.645</td>
</tr>
</tbody>
</table>

Note: <sup>a</sup>Reference Category

### CONCLUSION

It is observed from the study that the most relevant factor for the survival of the infant is breastfeeding, therefore it should be encouraged. For achieving the required reduction in infant mortality government should further make some policies to develop rural areas and to reduce the risk of survival of the first birth order, proper medical care should be implemented in addition to existing one. There is also an essential requirement to encourage female for the higher education level and discourage home delivery. On the basis of this study we may conclude that small family size has a negative impact and the couples who plan their child during the first four year of their marriage have a positive impact on the survival of infant.

**Ethical Clearance** - Research is based on the secondary data of National Family Health Survey, India.

**Source of Funding** - NIL

**Conflict of Interest** - NIL

### REFERENCES


4. Hirve S, Ganatra B. A Prospective Cohort Study on the Survival Experience of under-five children
in rural western India. Indian Pediatrics, 1997; 34: 995-1001.


Retinal Degeneration Using Iris Image through Machine Learning

D Nagarajan1, R Sujatha2, J Kavikumar3, Chang Phang3, M.Lathamaheswari1

1Department of Mathematics, Hindustan Institute of Technology & Science, Chennai, India, 2Department of Mathematics, SSN College of Engineering, Chennai, India, 3Department of Mathematics and Statistics, Faculty of Applied Science and Technology, Universiti Tun Hussein Onn Malaysia

ABSTRACT

Retinal degeneration is one of the vital cause of vision loss. Retinal degeneration is induced through the declension of the retina middle part. The aim of our proposed paper is to detect retinal degeneration by using image processing. This involves segmentation, plotting of histogram, edge detection. The performance measures are calculated and compared with those of normal eye by machine learning singular value decomposition and correlation.

Keywords: Retinal degeneration, machine learning, histogram, edge detection

INTRODUCTION

Now a day the main challenge faced by developing countries is to prevent the eye diseases like retinal degeneration. Generally most affected are senior citizens. Reason for degeneration is eventually demise of cells in retina. Other cause of degeneration is blockage in vein and diabetic. The degeneration causes blindness, starting with tunnel vision, peripheral sight loss. The main cause of these types of degeneration is genetic disorder and ageing. It is necessary for new approaches involving machine learning to diagnose and detect these effects in time for better health adjunct system. It helps the society. Damage of macula and a little blemish approximately close to the midpoint of eye in the retina leads to retina degeneration and subsequently vision loss. The retina degeneration progress is quick and might lead to vision loss in one eye or both eyes. The general symptom of retina degeneration is blurred region close to the mid of vision.

In past years researchers much attention about the sight of the eye 2,11,13. Several attempts have been deal to search for eyes degeneration5,7. Contrast and balance of gray is useful to identify feature extraction9,17,14. in 7, discuss about the correlation between iris. Analyses of irises and eyelids are using Hough Transform 10-12. Filters are used to identify the detection of edges 6. Fractal features extraction are used for image segmentation4,8,16. In9 used the images of facial through dimension of fraction. In 15, a method to identify the shape of the iris images. This is done through image segmentation and edge detection18.

Data Base

The data base in this work is Retina Gallery. Fig.1 depicts the iris of a normal person.

METHODOLOGY

The methodology involves, machine learning and singular value decomposition. The images are selected from the database and processed using MATLAB-R2015a. For each image are computed. Singular value decomposition is used for comparison of normal iris and degenerated iris.

If a real symmetric n x n matrix and orthogonal matrices U and V and a diagonal matrix S then .

Fig:1 Normal Iris
Any non-square matrix is converted as a square matrix through singular value decomposition in order to calculate the correlation coefficient. Detection is mainly based on the comparison of correlation coefficient normal iris and degenerated iris.

RESULTS AND DISCUSSION

The performance measures namely sensitivity, specificity and accuracy of the input image are calculated in order to diagnose the iris for detection of macular degeneration. Through the diagnostic test the result shows that the output is true positive that means not affected from disease. It measures the degree of veracity of a diagnostic test on a condition.

These measures are based on the results of edge detection described in the following

Fig: 2 Stages of segmentation, edge detection

Fig: 2 shows that the stages of segmentation, edge detection of degenerated eye through machine learning. It shows that it connects to the brain and the blood vessels are connect through the nerve. This ratio is a measure of the growth of macular degeneration. The histogram plot reveals the intensity of light distribution and peak of macular degeneration black spot.

The original image is converted from RGB to Green Channel. Complement structuring Element Morphological operation is done by Median Filter. Removal of background and image adjustment using intensity of the image is performed. It reveal that it show the segmentation of the retina blood vessels through morphological operation.

Below table presents to numerical measures for parameters A is accuracy, S is sensitivity, Sp is specification

<table>
<thead>
<tr>
<th>Image</th>
<th>A</th>
<th>S</th>
<th>Sp</th>
<th>Fpr 1-specificity</th>
<th>PPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.8118</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0.7597</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0.9348</td>
<td>0.7160</td>
<td>0.9919</td>
<td>0.0031</td>
<td>0.7377</td>
</tr>
</tbody>
</table>
The above table 1 shows that the numerical measure of the parameter. The conclusion on the comparison of normal iris and degenerated iris is based on correlation coefficient values. In table 2, detection of macular degeneration is presented along with correlation coefficient. The value of the sensitivity and specification shows that iris information. Form the above results to compare the iris using correlation analysis.

**Table2. Correlation coefficient & detection of retina degeneration**

<table>
<thead>
<tr>
<th>Image</th>
<th>Correlation coefficient</th>
<th>Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0053</td>
<td>Affected</td>
</tr>
<tr>
<td>2</td>
<td>0.0060</td>
<td>Affected</td>
</tr>
<tr>
<td>3</td>
<td>0.0046</td>
<td>Affected</td>
</tr>
<tr>
<td>4</td>
<td>0.0008</td>
<td>Affected</td>
</tr>
<tr>
<td>5</td>
<td>0.0077</td>
<td>Affected</td>
</tr>
<tr>
<td>6</td>
<td>0.0048</td>
<td>Affected</td>
</tr>
<tr>
<td>7</td>
<td>0.0072</td>
<td>Affected</td>
</tr>
<tr>
<td>8</td>
<td>0.0042</td>
<td>Affected</td>
</tr>
<tr>
<td>9</td>
<td>0.0023</td>
<td>Affected</td>
</tr>
<tr>
<td>10</td>
<td>0.0075</td>
<td>Affected</td>
</tr>
<tr>
<td>11</td>
<td>0.0031</td>
<td>Affected</td>
</tr>
</tbody>
</table>

**Cont.. Table2.**

<table>
<thead>
<tr>
<th>Image</th>
<th>Correlation coefficient</th>
<th>Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0.0022</td>
<td>Affected</td>
</tr>
<tr>
<td>13</td>
<td>0.0064</td>
<td>Affected</td>
</tr>
<tr>
<td>14</td>
<td>0.0042</td>
<td>Affected</td>
</tr>
<tr>
<td>15</td>
<td>0.0033</td>
<td>Affected</td>
</tr>
<tr>
<td>16</td>
<td>0.0089</td>
<td>Affected</td>
</tr>
<tr>
<td>17</td>
<td>0.0106</td>
<td>Affected</td>
</tr>
<tr>
<td>18</td>
<td>0.0078</td>
<td>Affected</td>
</tr>
<tr>
<td>19</td>
<td>0.0044</td>
<td>Affected</td>
</tr>
<tr>
<td>20</td>
<td>0.0107</td>
<td>Affected</td>
</tr>
</tbody>
</table>

**Histogram**

Drusen identify through asymmetric distribution from histogram of an image. Compounding of like distribution in asymmetric kurtosis. The statement of the skewness is given below table3
Normal image histogram

From the below Fig: 3 shows that according to shape of skewers is positive. So difficult to differentiate drusen from the images

![Normal Image Histogram](image1)

**Table: 3 Histogram distribution analysis**

<table>
<thead>
<tr>
<th>Skew is equal to zero</th>
<th>Playtkurtic</th>
<th>Output of an image is combining of more than two distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mesokurtic</td>
<td>Only one distribution is close to large drusen</td>
</tr>
<tr>
<td></td>
<td>Leptokurtic</td>
<td>Incessant background</td>
</tr>
<tr>
<td>Positively skewed</td>
<td>Playtkurtic</td>
<td>Drusen in approximately equally distributed</td>
</tr>
<tr>
<td></td>
<td>Mesokurtic</td>
<td>Difficult to differentiate</td>
</tr>
<tr>
<td></td>
<td>Leptokurtic</td>
<td>Little area of drusen of eminent chroma</td>
</tr>
<tr>
<td>Negatively skewed</td>
<td>Playtkurtic</td>
<td>90 % of the area is in background</td>
</tr>
<tr>
<td></td>
<td>Mesokurtic</td>
<td>90 % of the area is in background</td>
</tr>
<tr>
<td></td>
<td>Leptokurtic</td>
<td>90 % of the area is in background</td>
</tr>
</tbody>
</table>

CONCLUSION

The proposed robust methodology to detect retina degeneration using singular value decomposition and correlation coefficient is discussed. Singular value decomposition extraction is used to select the most significant segmentation method for identifying retina degeneration. From histogram analysis to identify the stage of degeneration. These results are very useful to finding the retina degeneration.

Compliance with ethical Standards

**Ethical approval:** The article does not contain any studies with human participants or animal performed by any of the authors.

**Source of Funding** - Self

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Informed consent:** Informed consent was obtained from all individual participants included in the study.

REFERENCES


To Study the Frequency of Cystic and Solid Lesions among Solitary Thyroid Nodules

Dinesh Kumar Singh¹, Anju Singh², Paras Kharbanda¹

¹Associate Professor, Pathology, ²Professor, Forensic Medicine, Mayo Institute of Medical Sciences, Barabanki

ABSTRACT:

BACKGROUND: In practical and numerical terms, the solitary nodule is the most important target of thyroid FNAC. Since FNAC can provide an unequivocal benign diagnosis in 60% of patients with benign nodules, its potential to reduce the number of unnecessary operations is significant. Of all the thyroid glands that on surgical resection prove to contain solitary nodules, 70-80% are benign adenomas and about 10-30% is malignant growth. Over the past two decades, fine needle aspiration cytology (FNAC) has become an essential step in the evaluation of thyroid nodules, due to its superior diagnostic reliability and cost effectiveness. AIMS & OBJECTIVES: The present study aims to explore the frequency of cystic and solid lesions among solitary thyroid nodules (excluding multiple nodular lesion). MATERIAL & METHOD: 140 patients of more than or equal to 15 years of age presenting with solitary thyroid nodule were the subjects of the current study. Subjects were referred for fine needle aspiration by the treating clinicians. OBSERVATIONS: Male: Female ratio was (18/122) 1:6.8 and age of the patients ranged from 15 years to 62 years. Maximum number of cases was in 3rd and 4th decades. 4 patients were in 7th decade. Cytodiagnostic break up of all 122 cases included colloid goitre 31 cases (25.5%), hyperplastic nodule 3 cases (2.5%), lymphocytic thyroiditis 2 cases (1.6%), Hashimoto’s thyroiditis 7 cases (5.7%) and subacute thyroiditis 5 cases (4.0%), from non-neoplastic category. CONCLUSION: It was concluded that FNAC of thyroid is a safe, simple, cost-effective, reliable and accurate investigation for cases of solitary thyroid nodule.

KEYWORDS: FNAC, Solitary Thyroid nodules, cystic, Solid, Histological Correlation.

INTRODUCTION

The thyroid gland is a bilobed organ situated in the anterior neck in front of the upper trachea. The normal thyroid gland in adult weighs 15-30 gm.¹ Normal function of the thyroid gland is to secrete thyroxine (T4) and triiodothyronine (T3). FNAC is highly successful in triaging patients with solitary thyroid nodule into operative and non-operative groups.² It may also be diagnostic for certain thyroid lesions, such as colloid goiter, Hashimoto’s thyroiditis, papillary carcinoma, anaplastic carcinoma, large cell lymphoma, and metastatic carcinoma. In practical and numerical terms, the solitary nodule is the most important target of thyroid FNAC.³

Over the past two decades, fine needle aspiration cytology (FNAC) has become an essential step in the evaluation of thyroid nodules, due to its superior diagnostic reliability and cost effectiveness.⁴ Since FNAC can provide an unequivocal benign diagnosis in 60% of patients with benign nodules, its potential to reduce the number of unnecessary operations is significant.⁵, ⁶, ⁷, ⁸, ⁹

Palpable thyroid nodules occur in 4-7% of the population (10 to 18 million persons) but nodules found incidentally on USG suggest a prevalence of 19-67%.¹⁰ Thyroid carcinoma occurs in roughly 5-10% of palpable nodules.¹⁰ Thyroid cancers constitute only about 1-2% of all malignant neoplasms in most populations and are three times more common in women than in men.¹¹ The prevalence of thyroid cancer in patients undergoing fine needle aspiration biopsy is estimated to be about 4%. Of all the thyroid glands that on surgical resection prove to
contain solitary nodules, 70-80% are benign adenomas and about 10-30% is malignant growth.\textsuperscript{12}

**AIMS & OBJECTIVES**

The present study aims to explore the frequency of cystic and solid lesions among solitary thyroid nodules (excluding multiple nodular lesion).

**OBJECTIVES:**

1. To study the distribution of thyroid lesions according to age & sex.

2. To study the frequency of cystic & solid lesions amongst solitary thyroid nodules.

**MATERIAL & METHOD**

This study was performed in the Department of Pathology, D.Y. Patil Medical College, Kolhapur during a study period of 2 year from June 2008 – to May 2010. 140 patients of more than or equal to 15 years of age presenting with solitary thyroid nodule were the subjects of the current study. Subjects were referred for fine needle aspiration by the treating clinicians.

**Observations**

**Table -1: DISTRIBUTION OF CASES ACCORDING TO SEX**

<table>
<thead>
<tr>
<th>S. NO.</th>
<th>SEX</th>
<th>NO. OF CASES</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female</td>
<td>122</td>
<td>87.1</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>18</td>
<td>12.9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>140</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Table -2 Distribution of cases according to Age**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Age (range)</th>
<th>No. Of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10-19</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>20-29</td>
<td>49</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>30-39</td>
<td>41</td>
<td>29</td>
</tr>
<tr>
<td>4</td>
<td>40-49</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>50-59</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>&gt;60</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>140</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Table -3: FREQUENCY OF CYSTIC AND SOLID THYROID NODULES AND THEIR ADEQUACY**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Lesion</th>
<th>No. of cases</th>
<th>Percentage</th>
<th>Adequacy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Adequate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>1</td>
<td>Solid</td>
<td>122</td>
<td>87.14</td>
<td>114</td>
</tr>
<tr>
<td>2</td>
<td>Cystic</td>
<td>17</td>
<td>12.14</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Solid/Cystic</td>
<td>1</td>
<td>0.71</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>140</td>
<td>100</td>
<td>122</td>
</tr>
</tbody>
</table>

Cases were also divided into solid, cystic and solid/cystic on the basis of the aspiration of fluid during procedure or on ultrasonographic findings.

Most of the nodules were solid accounting for 122 cases out of 140 (87.14%) and of the remaining cases, 17 cases (12.14%) were cystic and only one case (0.71%) was partly solid cystic.

Majority of the aspirates from solid nodules were adequate i.e. 114 out of 122 (93.4%) and only 8 out of 122 (6.6%) were inadequate, where as most of the
aspirates from cystic nodules (10 out of 17 i.e. 58.8%) were considered inadequate and only 7 of the 17 (41.2%) were considered adequate. Aspirate from partly solid/cystic nodule was found to be adequate.

**DISCUSSION**

In the present study, a total of 140 cases of solitary thyroid nodule were subjected to fine needle aspiration cytology (without imaging guidance). Of these, 122 cases (87%) were found to be adequate by Goellner’s criteria\(^3\) and 18 cases (13%) were considered inadequate (Table-3).

**Table - 4: Comparison of Distribution of cases according to sex**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>78%</td>
<td>69.56%</td>
<td>66.66%</td>
<td>86.4%</td>
<td>69.4%</td>
<td>87%</td>
</tr>
<tr>
<td>Male</td>
<td>22%</td>
<td>30.43%</td>
<td>33.44%</td>
<td>13.6%</td>
<td>30.6%</td>
<td>13%</td>
</tr>
<tr>
<td>Female/Male Ratio</td>
<td>3.56:1</td>
<td>2.33:1</td>
<td>2.03:1</td>
<td>6.35:1</td>
<td>2.21:1</td>
<td>6.7:1</td>
</tr>
</tbody>
</table>

In all these studies no of females presenting as thyroid lesions is higher than males.

**Table - 5: Comparison of no of cystic and solid thyroid nodules with other studies**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td>70%</td>
<td>-</td>
<td>70%</td>
<td>87.14%</td>
</tr>
<tr>
<td>Cystic</td>
<td>30%</td>
<td>15-37%</td>
<td>12.5%</td>
<td>12.14%</td>
</tr>
<tr>
<td>Solid/ Cystic</td>
<td>-</td>
<td>-</td>
<td>17.5%</td>
<td>0.71%</td>
</tr>
</tbody>
</table>

In our study the percentage of solid lesion was obtained 87.14% which was higher to those quoted by Silverberg\(^4\) (70%) & Raza sohail et al (70%).

In our study % of cystic lesion was 12.14% which was similar to those quoted by Raza sohail et al (12.5%) & lower than those quoted by Silverberg\(^4\) (30%). In our study % of solid/cystic lesion was 0.71% which was lower than those quoted by Raza Sohail et al (17.5%). Bellantone R \(^5\) et al (2004) mentioned the frequency of cystic thyroid nodules to be 15-37% of all surgically excised thyroid nodules.
CONCLUSION

Colloid goiter was the most common lesion amongst all non-neoplastic diagnoses. Great majority of these cases showed scant to moderate cellularity, good amount of colloid with or without histiocytes and monolayered honey comb sheets, thus enabling easy diagnosis. Thus it was concluded that FNAC of thyroid is a safe, simple, cost-effective, reliable and accurate investigation for cases of solitary thyroid nodule as firm diagnosis can be made on cytology alone in vast majority of cases, thus obviating the need for unnecessary surgical procedures. Cystic lesions mandate careful clinical correlation.

Ethical Clearance – Taken from ethical committee

Source of Funding- Self

Conflict of Interest- None

REFERENCES


Prevalence of Pregnancy Associated Listeriosis in and around Puducherry, India

Balamuruganvelu Singaravelu¹, Sreenivasalu Reddy V², Geethavani Babu³, S Kamala Kannan⁴

¹Research Scholar, Bharath University, BIHER, Chennai, India & Professsor DM, Wayanad Institute of Medical Sciences, Wayanad, ² Professor, Bharath University, BIHER, Chennai, India, ³Lecturer, Department of Microbiology, DMWIMS, Wayanad, Kerala, ⁴Assistant Professor, Government Tiruvanamalai Medical College and Hospital

ABSTRACT

Background: Listeriosis ranks the most frequent source of death among the bacterial food-borne illnesses with high Case fatality rate of 20% to 30% and neonatal death rate 50%. Listeriosis incidence in pregnancy has been reported 18 to 20 times higher than in general population. Hence the present study was planned to evaluate the prevalence of pregnancy associated Listeriosis in and around Puducherry India.

Method: A total of 335 pregnancy associated cases which includes 129 pregnant women, 34 women with miscarriage/spontaneous fetal loss and 172 neonates from whom 147 blood samples, 138 amniotic fluid or HVS, 2 diarrheal stool samples, 19 CSF, 14 placental bits or umbilical cord and 15 abortus material were aseptically collected and processed for isolation of *Listeria* spp.

Results: The overall prevalence of pregnancy associated Listeriosis was 6.3%. Pregnant women accounted for 11.62% positive cases, 8.82% of women with spontaneous abortion/miscarriage and 1.74% of neonates were found positive for Listeriosis in the present study.

Conclusion: Considering the increased incidence of pregnancy associated Listeriosis in our setting, this disease should be considered as an important differential diagnosis in clinical practice especially among pregnant women and women undergoing miscarriage or fetal loss.

Keywords: pregnant women, neonates, Listeriosis, miscarriage.

INTRODUCTION

Listeriosis ranks the most frequent cause of death among all the bacterial food-borne illnesses¹ with case fatality rate of about 20% to 30%, neonatal death rate 50% and hospitalization rate 91%²⁻³. Listeriosis incidence in pregnancy has been reported 18 to 20 times higher than in general population and moreover Listeriosis infection in pregnancy shows poor prognosis for the fetuses⁴. Listeriosis in pregnancy results in intrauterine infection leading to complications like spontaneous abortion, still birth, preterm labor and neonatal infections like neonatal sepsis or meningitis resulting in morbidity and mortality⁵. In India reports on human Listeriosis are scanty with only few documented cases and less than 15 publications such as isolation of this pathogen from women with premature birth, spontaneous abortions or miscarriage or from women with bad obstetric history patients in Mumbai⁶, in Delhi⁷ in south India⁸ and few other places⁹⁻¹⁰. A report on Listeriosis in 2nd trimester pregnant women from Chandigarh¹¹. Isolation of *Listeria* in cases with neonatal meningitis or meningoencephalitis from North India¹², from Mumbai¹³ and from South India¹⁴. Listeriosis has been considered as an emerging foodborne disease in India and *Listeria monocytogenes* a growing threat¹⁵. Besides all Listeriosis in India largely remains ignored mainly because the clinical diagnosis

Corresponding author:
S. Kamala Kannan,
Assistant Professor, Department of E N T
Government Tiruvannamalai medical college and Hospital, Tiruvannamalai
Email : skamalk23@gmail.com, Ph. 9443270219

DOI Number: 10.5958/0976-5506.2019.00275.4
of Listeriosis is insufficient owing to its varied clinical forms and complex immunopathological aspects. Most often naturally occurring Listeriosis in humans has been unrecognized or unexposed owing to the lack of a rapid, simple, appropriate and reliable diagnostic tool. Moreover the low incidence rate and failure to isolate the pathogen due to its rarity or lack of awareness or many a times it’s been missed owing to lack of identification. Till date the literature reviews suggest there is paucity of data pertaining to the Listeria infections among pregnant women and neonates in this subcontinent. The altering food habits, non-availability of vaccine for this disease, the capability of Listeria spp. to survive at refrigeration or low temperatures and its case fatality rate suggests that Listeriosis could be the single largest killer in humans and animals. Moreover the increased food borne incidences of Listeria spp. has gained huge public health significance. Hence the present study was planned to evaluate the prevalence of pregnancy associated Listeriosis in and around Puducherry India.

METHOD

A cross-sectional study conducted over a period of 1 year from June 2015 to May 2016 in the Department of Microbiology, Sri Lakshmi Narayana Medical College, Hospital and Government General Hospital, Puducherry, India. This study was approved by the Institutional Human Ethics Committee and Informed consent was obtained from all participants included in the study. In order to accomplish the objective a total of 335 cases which includes 129 pregnant women, 34 women with spontaneous abortion and neonates aged ≤ 4weeks presenting either with fever, flu–like illness, diarrhea, vomiting, with signs and symptoms of sepsis/ meningitis/ meningoencephalitis/ encephalitis, who fulfilled the inclusion criteria from various hospitals in and around Puducherry such as Sri Lakshmi Narayana Institute of Medical Science, Rajiv Gandhi Government Women and children Hospital, India Gandhi Government General Hospital & Post Graduate Institute and Pondichery AIDS Control Society were accounted for this study. From the above mentioned cases 147 blood samples, 138 amniotic fluid or HVS, 2 diarrheal stool samples, 19 CSF, 14 placental bits or umbilical cord and 15 abortus material were aseptically collected, instantly transported to microbiology laboratory and processed immediately for the isolation of Listeria spp. following the USDA protocol proposed by Mc Clain and Lee in 1988 with certain modifications. Briefly the specimens were enriched by 2step enrichment method i.e, by inoculating in UVM broth -1 and incubating for 24 hrs at 30°C followed by enriching in UVM broth -2 with incubation at 30°C for 24 hours. Then a loopfull inoculum from enriched UVM broth- II was plated on to selective medium PALCAM agar and observed for Listeria colonies after incubation for 24 hrs at 37°C. Grayish glistening colonies surrounded with a diffusing black zone surrounding the colonies were presumptively taken as Listeria colonies. The identified Listeria colonies were then subjected to Gram’s staining and examined morphologically for Gram positive coccobacilli. Isolates showing tumbling motility at 20°C to 25°C was then confirmed for genus Listeria on the basis of Latex agglutination test using LK07- Hi Listeria Latex Test Kit -Hi-Media, India. The identified Listeria isolates were further subjected to biochemical characterization using KB012A-Hi Listeria identification kit to differentiate genus Listeria up to spp. level. The isolates exhibiting catalase, esculin, voges proskauer test and methyl red positive and nitrate test negative were considered as “presumptive” Listeria isolates. Isolates which showed α-methyl - D mannoside, glucose, rhamnose, lactose and sucrose positive reaction, xylose and mannitol negative reaction were considered as Listeria monocytogenes and the rest were categorized as other Listeria spp.

RESULT

The current study was conducted over a course of 1 year extending from June 2015 to May 2016 and was executed to determine the prevalence of pregnancy associated Listeriosis in and around Puducherry India. A total of 335 cases i.e., pregnant women, women with spontaneous abortion and neonates aged ≤ 4weeks presenting either with fever, flu –like illness, diarrhea, vomiting, with signs and symptoms of sepsis/ meningitis/ meningoencephalitis/ encephalitis who fulfilled our inclusion criteria were enrolled for the study.

| Table No.1 : Overall Prevalence of Pregnancy associated Listeriosis |
|-------------------------|------------------------|-----------------|
| No. of cases | No. of cases positive | Percentage (%) |
| 335 | 21 | 6.3% |

In this study out of 335 pregnancy associated cases screened for Listeriosis nearly 21 cases
were found positive for Listeriosis, with this the overall prevalence of pregnancy associated Listeriosis was 6.3% (Table No.1). The prevalence of Listeriosis among pregnancy associated cases included in the study is shown in Table No.2. Out of 129 pregnant women screened in the present study nearly 15 (11.62%) cases showed positive for Listeriosis. Of the 34 women with spontaneous abortion /miscarriage screened 3 (8.82%) cases turned positive for Listeriosis. 3/172 (1.74%) neonates screened were found positive for Listeriosis in the present study.

### Table No.2 : Prevalence of Listeriosis among Pregnancy associated cases included in the study.

<table>
<thead>
<tr>
<th>Pregnancy associated cases</th>
<th>No. of cases</th>
<th>No. of cases positive</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant women</td>
<td>129</td>
<td>15</td>
<td>11.62%</td>
</tr>
<tr>
<td>Women with spontaneous abortion / miscarriage</td>
<td>34</td>
<td>3</td>
<td>8.82%</td>
</tr>
<tr>
<td>Neonates</td>
<td>172</td>
<td>3</td>
<td>1.74%</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Listeriosis a dreaded disease of the west appears to have knocked the Indian subcontinent mainly due to rapid unplanned urbanization and globalization\(^7\). The disease in humans is chiefly through ingestion of food items contaminated with *Listeria* and the clinical spectrum of this disease varies from self-limiting febrile diarrhea to more serious invasive Listeriosis including bacteremia, sepsis, meningocencephalitis and abortion/ still birth\(^7\). The present study was proposed to determine the prevalence of pregnancy associated Listeriosis in and around Puducherry India. The overall prevalence of pregnancy associated Listeriosis in the present study was 6.3%. The results of the present study was found to be in agreement with the reports from most of the countries such as a report from Lombardy region Italy which reported nearly 15/134 were pregnancy-associated Listeriosis\(^22\). The number of Listeriosis cases recorded from 2004 to 2007 through the U S. *Listeria Initiative* has shown 16-9% of cases were pregnancy associated , reports from *Listeria initiative* during 2009 to 2011 reported through MMWR has showed pregnancy associated Listeriosis to be 14%\(^23\). Most reports from USA and Europe has shown about 15% and 6- 18% of Listeriosis cases respectively are pregnancy related\(^24,25\). Although the pregnancy associated Listeriosis is considered as a benign disease of the mother mainly because of its grave outcome in fetus, the pregnancy related Listeriosis is a major medical issue to be addressed that requires a deep clinical suspicion, highlighting the need for effective prevention in this category. Moreover the lack of awareness regarding the risk of certain food products in pregnancy would have contributed to pregnancy associated Listeriosis. Hence there is urgent requirement for preventive action among the pregnant women including the education on the avoidance of certain unsafe foods in pregnancy, as well as decontamination and food hygiene. Further steps addressing the decline in pregnancy related Listeriosis with improved industry and regulatory efforts to reduce *Listeria* contamination in foods is required. Hence a higher concern from the healthcare community or physician awareness towards pregnancy-associated Listeriosis is also mandated.

Pregnant women accounted for a considerable proportion of Listeriosis cases 11.62% followed by and women with spontaneous abortion /miscarriage accounted for 8.82% These results are concurrent with earlier published works where in the pregnant women accounted for a majority of all Listerial infection in humans , with the incidence of *Listeria* infection in pregnant women to be 12 per 100,000 in comparison to 0.7 per 100,000 in general public\(^26\). The results are also in accordance with the recent published reports were an increasing incidence of pregnancy related Listeriosis has been furnished\(^26, 27\). Our report on isolation of *Listeria* from 8.82% of women with spontaneous abortion / miscarriage is well correlated with most studies conducted in India such as one reported by Krishna et al in 1966 with isolation of *Listeria* from 14% of cases with abortion or miscarriage or stillbirth in Mumbai\(^8\) and isolation of *Listeria* from habitual abortions reported by several authors\(^28,29\). Whereas the results of the present study was quiet higher when compared to a report published by Bhujwala and Hingorani in 1975 who reported 1.34 % of cases with abortion or miscarriage screened were positive for *Listeria*\(^7\). The reasons for current rise in Listeriosis infection among pregnant women and women with spontaneous abortion or miscarriage could include the poor food hygiene practices, environmental and other host factors\(^4,27\). Hence Listeriosis to be included in the differential diagnosis in clinical practices especially among pregnant women,
women with spontaneous abortion / miscarriage.

Neonatal Listeriosis in our study was found to be 1.74% which is in par with few reports published earlier and the estimated prevalence of Neonatal Listeriosis is 8.6 per 100 thousand\textsuperscript{30,31}. Thomas et al in 1981 from North India has shown 0.2% neonatal Listeriosis in total live births\textsuperscript{12}. Although, widely known that Listeriosis in pregnancy or maternal Listeriosis is extremely mild for pregnant women themselves, but it is of life-threatening with highly fatal outcomes for the neonates\textsuperscript{26}. Moreover neonates and women during the antenatal period are highly susceptible to Listeriosis apparently due to their depressed or lack of CMI. Hence the present study emphasizes the need to screen for pregnancy associated Listeriosis in order to prevent further complications such as preterm labor, still birth, neonatal sepsis and meningoitis which is extremely fatal as neonatal morbidity and mortality is possibly preventable with timely diagnosis and quick interventions. Hence care must be taken to report this pathogen in routine diagnosis.

Conclusion: Considering the increased incidence of pregnancy associated Listeriosis in our setting, this disease should be considered as an important differential diagnosis in clinical practice especially among pregnant women and women undergoing miscarriage or fetal loss. The pregnancy associated Listeriosis in our study was the highest that is currently described, signifying that effective or forceful preventative action against this group will have a great impact in lowering the abortion rates and fetal loss. This study concludes that a very high index of clinical suspicion and due diligence is mandatory in laboratory diagnosis of maternal or pregnancy associate Listeriosis.

Ethical Clearance- Institution Ethics committee (Human studies): No. IEc/C- P/62/2015

Source of Funding- Self

Conflict of Interest - Nil

REFERENCES


15. Chugh TD. Emerging and re-emerging bacterial


Dengue Cases Treated in Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar in Year 2016

Harpreet Kaur1, S L Mahajan2
1Statistician Cum Lecturer, 2Professor, Cum Nodal Officer, National Vector Borne Disease Control Program and Integrated Disease Surveillance Programme, Department of Community Medicine, Sri Guru Ram Das Institute of Medical Sciences and Research, Sri Amritsar

ABSTRACT

Introduction: Sri Guru Ram Das Institute of Medical Sciences & Research, Amritsar is a tertiary health care institution. Dengue is a viral infection mainly transmitted by female Aedes aegypti and Ae. Albopictus mosquitoes. It has spread globally in recent decades. Dengue virus (DENV) has four distinct and closely related serotypes i.e. DENV-1, DENV-2, DENV-3 and DENV-4. Severe dengue causes serious illness and deaths. Dengue has no treatment but can be prevented and controlled. Materials and method: Data of confirmed dengue cases treated in SGRDIMSR, Amritsar in year 2016 were collected; analyzed and valid conclusions were drawn. Findings: In year 2016, 198 dengue cases were reported. Maximum number of cases, 57 (28.8%) was found in age 21-30 years, majority, 118 (59.6%) were males and higher number of cases, 177 (89.4%) was found in urban area. All the cases were reported from August to November with the peak in September. Maximum cases 160 (80.8%) were found positive by NS-1 Ag. Mean gap between admission and testing of cases was 5 ± 2.1 days. Average length of stay of cases in hospital was 6.1 ± 2 days. Conclusion: Emphasize, to take all preventive measures, vector control, appropriate hospital care of cases and promote the use of NICD Coolers.

Keywords: Dengue, Severe dengue, Aedes aegypti, Aedes albopictus.

INTRODUCTION

Dengue is a human arbovirus disease transmitted by the female mosquito of the genus Aedes, mainly Aedes aegypti and Ae. Albopictus1. There are four distinct, but closely related, serotypes of the virus that cause dengue (DEN-1, DEN-2, DEN-3, and DEN-4). Recovery from infection by one provides lifelong immunity against that particular serotype. Subsequent infections by other serotypes increase the risk of developing severe dengue. However, cross-immunity to other serotypes after recovery is only partial and temporary2.

Global burden of Dengue

The World Health Organization (WHO) considers dengue as a major global public health challenge in the tropic and sub tropic nations. Dengue has seen a 30-fold upsurge worldwide between 1960 and 2010, due to increased population growth rate, global warming, unplanned urbanization, inefficient mosquito control, frequent air travel and lack of health care facilities3,4,5. One recent (2013) estimate indicates that 390 million dengue infections occur every year (95% credible interval 284–528 million), of which 96 million (67–136 million) manifest clinically (with any severity of disease)6. Another (2012) study, of the prevalence of dengue, estimates that 3.9 billion people in 128 countries are at risk of infection with dengue viruses7.

Situation in India

Dengue is endemic in all states and union territories (UTs) of India. Both Aedes aegypti and Aedes albopictus are the main competent vectors for dengue virus in India8.
India receives 75% of its rainfall during the southwest monsoon period from June to September. Indian monsoon rainfall provides ample breeding habitats for *Ae. aegypti*, thus leading to high vector densities.

In the early 2000s, dengue was endemic in a few southern (Maharashtra, Karnataka, Tamil Nadu and Pondicherry) and northern states (Delhi, Rajasthan, Haryana, Punjab and Chandigarh). It has recently spread to many states, including the union territories. In addition to the increased number of cases and disease severity, there has also been a major shift in the geographical range of the disease. Dengue had been restricted to urban areas, but it has now spread to rural regions. In year 2017, the spike in cases of dengue was the highest in the last one decade, according to the data from National Vector Borne Disease Control Programme (NVBDCP) and National Health Profile 2018. From less than 60,000 cases in 2009, cases increased to 188,401 in 2017—more than a 300 per cent spike. Cement water tanks, water coolers, plastic containers and tiers are the preferred breeding habitats of Aedes mosquitoes. Coconut shells and latex cups are important breeding sites in Kerala and Lakshadweep Island. National Research Development Corporation of India found that in India about 60 to 70% of the Aedes mosquito breeding occurs in coolers in the urban areas and about 40% in rural areas. National Centre for Disease Control (NCDC) has developed a modified cooler with a covered water tank which prevents breeding of mosquitoes thus very helpful in preventing vector breeding and contributes towards control of dengue as a public health problem particularly in urban areas.

A dengue vaccine, Dengvaxia (R), has been registered in several countries. But it has not yet been approved by the Ministry of Health and Family Welfare, Government of India, because more clinical trials are thought to be necessary in India.

Present study aims to describe the Epidemiological profile of confirmed cases of dengue admitted in year 2016 in medicine and pediatric ward at Sri Guru Ram Das Institute of Medical Sciences & Research, Amritsar, Punjab, India.

### MATERIAL AND METHOD

A retrospective, descriptive study was conducted out in Sri Guru Ram Das Institute of Medical Sciences & Research (SGRIMSAR), Amritsar. Epidemiological data of confirmed cases of dengue and deaths due to dengue in year 2016 were collected from dengue wards established in SGRIMSAR, Amritsar. The study population included all the patients having their serum samples found confirmed for dengue by IgM Mac Elisa or NS-1 Ag test done in Government Medical College, Amritsar during this period.

#### Data Analysis

Data collected were analyzed by using SPSS software version 22 and the valid conclusions were drawn. p < 0.05 and p < 0.01 were considered significant and highly significant respectively.

### FINDINGS

In year 2016, 198 confirmed cases of dengue were reported in SGRIMSAR. No death was reported. Mean time gap in the date of admission of suspected dengue patients and testing of their blood samples for dengue was 5.01 ± 2.13 days. Average length of stay of dengue case in hospital was 6.12 ± 2.01.

Mean age of dengue cases was 33.21 ± 15.94 years. Maximum age was found to be 85 years and the minimum age was 2 months.

<table>
<thead>
<tr>
<th>Age in years</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>1-5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>6-10</td>
<td>8</td>
<td>4.0</td>
</tr>
<tr>
<td>11-20</td>
<td>35</td>
<td>17.7</td>
</tr>
<tr>
<td>21-30</td>
<td>57</td>
<td>28.8</td>
</tr>
<tr>
<td>31-40</td>
<td>38</td>
<td>19.2</td>
</tr>
<tr>
<td>41-50</td>
<td>35</td>
<td>17.7</td>
</tr>
<tr>
<td>&gt; 50</td>
<td>23</td>
<td>11.6</td>
</tr>
<tr>
<td>Total</td>
<td>198</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[X^2 = 114.6\] d. f. = 7 p = 0.000
Table 1 is showing the age wise distribution of confirmed cases of dengue. Maximum number of cases 57 (28.8%) were found in 21 to 30 years age groups and the minimum number, 1(0.5%) was found both in age groups < 1 and 5 years. The difference in the number of cases reported in different age groups was found highly significant statistically.

Table 2. Sex wise distribution of confirmed cases of dengue

<table>
<thead>
<tr>
<th>Sex</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>118</td>
<td>59.6</td>
</tr>
<tr>
<td>Female</td>
<td>80</td>
<td>40.4</td>
</tr>
<tr>
<td>Total</td>
<td>198</td>
<td>100.0</td>
</tr>
</tbody>
</table>

$X^2 = 7.3$  
$p = 0.007$  
d. f. =1

Table 2 is showing the sex wise distribution of confirmed cases of dengue. It is evident from this table that higher number of males cases, 118 (59.6%) than the female cases, 80 (40.4%) was found. The difference in the number of cases reported in the male and female sexes was found highly significant statistically.

Table 3. Area wise distribution of confirmed cases of dengue

<table>
<thead>
<tr>
<th>Area</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>177</td>
<td>89.4</td>
</tr>
<tr>
<td>Rural</td>
<td>21</td>
<td>10.6</td>
</tr>
<tr>
<td>Total</td>
<td>198</td>
<td>100.0</td>
</tr>
</tbody>
</table>

$X^2 = 1.2$  
$p = 0.000$  
d. f. =1

Table 3 is showing the area wise distribution of confirmed cases of dengue reported. Most of the cases 177 (89.4%) were reported from urban area and the difference in the number of cases reported from urban and rural areas was found highly significant statistically.

Table 4. Rural block wise distribution of confirmed cases of dengue

<table>
<thead>
<tr>
<th>Block</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baba Bakala</td>
<td>2</td>
<td>9.5</td>
</tr>
<tr>
<td>Lopoke</td>
<td>2</td>
<td>9.5</td>
</tr>
<tr>
<td>Manawala</td>
<td>5</td>
<td>23.8</td>
</tr>
<tr>
<td>Ramdas</td>
<td>2</td>
<td>9.5</td>
</tr>
<tr>
<td>Tarsika</td>
<td>1</td>
<td>4.8</td>
</tr>
<tr>
<td>Threawal</td>
<td>1</td>
<td>4.8</td>
</tr>
<tr>
<td>Verka</td>
<td>8</td>
<td>38.1</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>100.0</td>
</tr>
</tbody>
</table>

$X^2 = 13.3$  
$p = 0.03$  
d. f. =6

Table 4 shows the block wise distribution of confirmed cases of dengue in rural area. Maximum number of cases, 8 (38.1%) was reported from block Verka followed by Manawala, 5 (23.8%) and the minimum 1 in each block Tarsika and Threawal. The difference in the number of cases reported from different rural blocks was found highly significant statistically.

Table 5. Month wise distribution of confirmed cases of dengue

<table>
<thead>
<tr>
<th>Month</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>August</td>
<td>20</td>
<td>10.1</td>
</tr>
<tr>
<td>September</td>
<td>138</td>
<td>69.7</td>
</tr>
<tr>
<td>October</td>
<td>39</td>
<td>19.7</td>
</tr>
<tr>
<td>November</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>198</td>
<td>100.0</td>
</tr>
</tbody>
</table>

$X^2 = 225.6$  
$p = 0.000$  
d. f. =3

Table 5 is showing the month wise distribution of confirmed cases of dengue. This table shows that all the cases of dengue were reported from August to November only. The peak of cases, 138 (69.7%) was found in the month of September followed by 39 (19.7%) cases in October. Only one case was reported in November. Rising trend of the reporting of dengue cases had been observed from August to September and there was a declining trend from September to November. The
month wise difference in the number of cases reported was found highly significant statistically.

Table 6. Test wise distribution of confirmed cases of dengue

<table>
<thead>
<tr>
<th>Test</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS-1Ag</td>
<td>160</td>
<td>80.8</td>
</tr>
<tr>
<td>IgM Mac ELISA</td>
<td>38</td>
<td>19.2</td>
</tr>
<tr>
<td>Total</td>
<td>198</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ X^2 = 75.2 \quad d. f. = 1 \quad p = 0.000 \]

Table 6 shows the test wise distribution of confirmed cases of dengue. Maximum cases, 160 (80.8%) were found positive by NS-1 Ag while only 38 (19.2%) were found positive by IgM Mac ELISA. The test wise difference in the number of cases found positive has been found highly significant statistically.

**DISCUSSION AND CONCLUSION**

Mean time gap in the date of admission of confirmed dengue patients and testing of their blood samples for dengue was 5.01 ± 2.13 days. Average length of stay of dengue case in hospital was 6.12 ± 2.01. It is recommended that testing of the blood samples of dengue cases should be done on the same day of admission to reduce the dengue transmission to other non infected persons. This will also reduce the average length of stay of dengue cases in hospital. The impact of these effects will reduce the morbidity, severity and mortality of dengue and will give a useful economic effect by the reducing the expenditure of resources on the management of confirmed cases of dengue.

Age wise distribution in SGRDIMSAR in year 2016 shows the highest number of dengue confirmed cases, 57(28.8%) was found in age group 21-30 years which resembles the previous study conducted there in year 2015 and also a study conducted in Government Medical College, Amritsar in 2016 which also showed the highest number of cases in age group 21 to 30 years and most of the cases found in adult age.\[11, 19]\.

Sex wise distribution shows a male predominance (59.6%) in our study and this finding is in concordance with that of an earlier study done by Antony in a Medical College Hospital in Kerala, India.\[20]\.

Area wise distribution shows maximum number of cases, 177(89.4%) reported from urban area and 21(10.6%) cases reported from rural area in year 2016. Previous study done in SGRDIMSAR in year 2017, reported 13.1% cases from rural area, while in year 2008, district Amritsar, reported all the 196 suspected cases of dengue from the urban rural only.\[13]\ These studies conducted in SGRDIMSAR have shown that the dengue is spreading from the urban to the rural areas. The findings pertaining to the present study also provide similar picture with other parts of the country and show the need to lay emphasis on prevention and control of dengue in rural areas also.

Our study shows that all the cases occurred from August to November with peak in September month. These findings are similar to the findings of studies done in Brazil in 2015 and Bengaluru in 2017 which show that dengue is highly seasonal and increases primarily during the rainy season when vector breeding rate is very high. Study done in Bengaluru showed maximum cases of dengue reported in September month which also resembles our study.\[16, 21]\.

**CONCLUSION**

Present study shows that dengue had affected the most economically productive age group, more males than females were being affected. It had largely confined to urban areas and all the cases were reported during monsoon and post monsoon season (August to November). Although there was no mortality but morbidity was fairly high. As vaccine is still not licensed to use in India so vector control and appropriate; and timely management of dengue cases is the only method of choice. The entire preventive and control measures should be started well before the onset of dengue season. Promote use of NICD Desert Coolers. Conduct campaigns for behavior change communication like use of personal protective measures, Insecticide treated bed nets and wearing of full sleeve clothes during the day, environmental sanitation, no water collections in small containers in the surroundings and vector control. Control measures like establishment of separate dengue wards in hospitals, availability of equipments, materials and drugs etc. for early diagnosis and management of dengue cases should be taken well before the onset of dengue season.

**Acknowledgements:** Nil
Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not needed as the study is based on records of NVBDCP/IPSP programmes.

REFERENCE


Mediating Effect of Social Support on Stress among Parents of Children with Intellectual Disability

Deepak Pandey¹, Pushkar Dubey²

¹ICSSR-Post Doctoral Fellow, Pt. Sundarlal Sharma (Open) University Chhattisgarh, Bilaspur, C.G., India,
²Assistant Professor & Head, Department of Management, Pt. Sundarlal Sharma (Open) University Chhattisgarh, Bilaspur, C.G. India

ABSTRACT

Parents of children with intellectual disability put more care and effort in raising their children. The perceived stress faced by this segment of parents is more than that of the parents with normal child. It is therefore essential for the caregivers to release their burden to perform normal care giving functions. The objective of the study was to determine the effect of socio-economic demographics and social support on the perceived stress of parents with children with intellectual disability. The study was conducted in Chhattisgarh state among 100 parents of children with intellectual disability. Perceived stress scale and Social support scale were the tools used in the study for data collection. Purposive sampling technique was the method adopted in the study for the selection of samples in the study. Multiple hierarchical regression analysis was used to test the proposed model. Structural equation modeling (SEM) was used to further confirm the mediating effect of social support on income and stress. Result indicated that socio-demographic variables income, education and gender significantly contributed to the variation of stress and showed negative association with stress. However age did not contribute significantly in the variation of stress. Result of mediating effect of social support showed significant association between income and stress.

Keywords: Parents, Children with intellectual disability, Social support, Stress, Regression analysis.

INTRODUCTION

Mental disability in children has been a curse for the parents and creates economic burden for the family. Caregiver means an individual who provides direct care and support for chronically ill people. Parents need to put extra effort and time in fulfilling the responsibilities towards their ward. The level of perceived burden is associated with higher risks of depression and lower quality of life for parents of children with intellectual disability. Recently the American Association on intellectual and developmental disabilities (AAIDD) have approved a new nomenclature for mental retardation and have renamed it as intellectual disability. Children with intellectual disabilities throw challenge on their parents, as they have more of adjustment problems. It often upsets their life by increasing their perceived level of stress. Parents of children with intellectually disabled account for more stress. The behaviour and wellbeing of a child is found to have a greater impact on mother. Intellectual disability of a children is remarked by ill communication and lack of academic and social skills. Parental stress is defined as “multidimensional response to physical, psychological, emotional social and financial stressors usually associated with the experience of caring”.

Emotional support is the one of the first type of support which is intangible in nature. Instrumental support is the second type of support and is regarded as tangible and direct ways of assisting others. Its elements constitutes of financial boosting or materialistic gains. Informational support is the third type of support which is based on providing useful advice, guidance and suggestions to individuals, which act
as a prospect to solve problems. The fourth type of support is companion support which inculcates social belongingness and calls for shared social activities.

Many studies reveal that there are significant association between parental stress and social support. Families having children with intellectual disability experience more stress and less social support. Care giving burden for mothers are associated with higher education and less social support. Gross income and social support was found to have indirect overall effects on psychological health outcome. Low levels of social support were the most influential predictors of depression and anxiety in mothers. There is strong correlation between family support and parenting stress. In a study contradictory result was found and the relationship between the amount of informal support and level of parental stress was not confirmed. Moderation effect of social support was confirmed in perceived stress and resilience. Psychological stress was inversely related to perceived social support. Few other studies explore the influence of various socio-demographic variables and its correlation with stress in parents of intellectually disabled children. Income is found to be clinically significant with stress among parents of children with intellectual disability. Gender was significantly associated with risk of stress among parents.

**METHOD**

**Design:** Parents of intellectual disabled child were the sampling unit whereas purposive sampling technique was used for selecting samples for the study.

**Population:** All the parents of the children with intellectual disability of Chhattisgarh were considered for the study. For locating such population at primary level, hospitals at district headquarter were contacted. Information’s obtained from rehabilitation centers in Chhattisgarh was considered for the study.

**Tools:** The Perceived Stress Scale is used in the study. To assess social support a Social Support Scale was used in the study. Internal consistency Cronbach coefficient of the scale was found to be 0.92 which confirmed the internal consistency of data. Both of the scales were found to be reliable and valid.

The Demographic details such as age group, gender, income and educational qualification were also used in the survey form. A detailed description of the purpose of the study and the information requested for was provided in the covering letter.

**Procedure**

A survey based method was used to collect the data from the sample which lasted for about 13 weeks (i.e., from May to July 2017). 150 respondent parents participated in the study. Data were collected through personal means by the distribution of questionnaire in the beginning of May and was collected, as a when completed till July, 108 questionnaires were collected in the end, with a response rate of 72%. 100 questionnaires were found to be completed in all aspects, and hence were considered for inclusion for the final study.

**RESULT**

The demographic details of the respondents are presented in Table 1. The total sample size for the study constitute of 100 respondent parents, which are equally distributed in terms of male and female group.

**Table 1 Demographic information of the participants (N = 100)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Mean</th>
<th>SD</th>
<th>CI [95%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>50</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>50</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (Years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31-35</td>
<td>56</td>
<td>56%</td>
<td>35.19</td>
<td>2.733</td>
<td>34.65 - 35.73</td>
</tr>
<tr>
<td>36 – 40</td>
<td>44</td>
<td>44%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hierarchical multiple regression analysis was used in the study to predict the effect of study variables on stress as shown in the Table 2.\(^{[29]}\)

**Table 2: Hierarchical Multiple Regression analysis for Predictor on Stress**

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
<th>Model 3</th>
<th></th>
<th></th>
<th>Model 4</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>t</td>
<td>VIF</td>
<td>B</td>
<td>t</td>
<td>VIF</td>
<td>β</td>
<td>t</td>
<td>VIF</td>
<td>β</td>
<td>t</td>
<td>VIF</td>
</tr>
<tr>
<td>Income</td>
<td>-.544</td>
<td>-6.422</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>-.213</td>
<td>-2.532</td>
<td>1.042</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-.362</td>
<td>-4.561</td>
<td>1.651</td>
<td></td>
<td></td>
<td></td>
<td>-.476</td>
<td>-6.917</td>
<td>1.030</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>.544</td>
<td>.583</td>
<td>.748</td>
<td>.799</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R(^2)</td>
<td>.296</td>
<td>.340</td>
<td>.559</td>
<td>.639</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔR(^2)</td>
<td>.296</td>
<td>.044</td>
<td>.079</td>
<td>.220</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔF</td>
<td>F(1,98) = 41.241**</td>
<td>ΔF (1,97) = 6.410*</td>
<td>ΔF (1,96) = 20.800**</td>
<td>ΔF (1,95) = 47.844**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In model 1, factor income made significant contribution in variation of the stress \(F(1, 98) = 41.241, p<0.01\) and explained 29.6% of the variance in stress \((R = 0.544, ΔR^2 = 0.296)\). The standardised beta value \((β = -0.544, p<0.01)\) indicated significant negative association between predictor income and stress level of parents; it means higher the income lower will be parenting stress.

In model 2, factor education made significant contribution in variation of the stress \(ΔF (1, 97) = 6.410, p<0.05\). The introduction of factor education explained additional 4.4% variance in stress with overall 34% \((R = 0.583, ΔR^2 = 0.044)\). The predictor education was found to have significant negative association \((β = -0.213, p<0.01)\) with stress; that is indicate graduate and post graduate parents showed less stress.

In model 3, factor gender \((1 = \text{Male}, 2 = \text{Female})\) made significant contribution in variation of the stress \(ΔF (1, 96) = 20.800, p<0.01\) and explained overall 55.9% of variance in stress \((R = 0.748, ΔR^2 = 0.079)\); the model explained additional 7.9% of the variance in stress. The results indicated significant negative association between predictor gender of the participants and their stress \((β = -0.362, p<0.01)\); that means mothers showed higher stress in comparison to fathers of children with intellectual disability.

In the final model, main predicting factor in the study i.e. social support made significant contribution in variation of the stress \(ΔF (1, 95) = 47.844, p<0.01\) and explained overall 63.9% of variance in stress \((R = 0.799, ΔR^2 = 0.220)\); the model explained additional 22% of the variance in stress. The results indicated \((β = \)
significant negative association between predictor social support and stress; that means those who perceived higher social support in the society, family or friends their stress level was decreased.

Findings clearly indicated that age did not contribute significantly in the variation of stress; factors income, education, gender and social support were found to be significantly negatively and directly correlated with stress of the participants. Result indicates the explaining percentage of all predictors was 63.9%; this total of the variance included 29.6% for income, 4.4% for education, 7.9% for gender, and 22% for challenge.

Variance inflation factor (VIF) found, ranged from 1.000 to 1.651, which was distant from the 1.0 to 4.0, criteria that may indicate multicollinearity concern. It means that multicollinearity found significant correlation between all predicting variables.

All 100 cases were also included for confirm mediation effect worked out by structural equation model (SEM). Significance of mediation was examined by bootstrap. AMOS licensed version 24 was used for data calculation. Figure - 1 suggested that the total effect is .639, p<.01; direct effect found (.296, p<.01). In addition, figure - 1 suggested that the indirect effect is (.369, p<.01) of income on stress through social support was statistically significant. The mediation model showed statistical good model fit of data (CMIN/DF= < 2.01, RMSEA = .079, GFI = .984, NFI = .929 and CFI = .957).

DISCUSSION

The purpose of this study is to identify the effect of social support on stress level of parents of children with intellectual disability. It also studied the effect of various socio demographic variables like income, education and gender on the stress level of intellectually disabled children. The variable income is a significant predictor of stress and is negatively associated, which means that with the rise in income of the parents, there will be reduction in the stress or caregiving burden and is consistent with the previous findings of the related studies. Similarly education was also significant predictor of stress and is negatively associated confirming that there is decrease in the stress level of the care givers with the rise in their education level. Researcher had similar findings in their studies. Another demographic factor gender was significant predictor of stress is in keeping with the findings of other studies. The impact of social support on stress of the parents of children with intellectual
disability was significant and is very much consistent with the past studies.\textsuperscript{[15,18]} However the dimension age was insignificant on stress and was not found consistent with the earlier studies. The role of social support as a mediating variable between income and stress was found significant in the study.\textsuperscript{[22]}

**CONCLUSION**

Stress has become an integral part of life. The condition of stress is developed within the environment. Parents of children with intellectual disability have an extra responsibility for caring their child and are subjected to more stressful conditions. As there is a relationship between social support and stress, the parents in order to reduce stress need more of emotional, tangible and informational support from the surroundings. Socio demographics of the parents also have significant relationship with the stress level. As income is a necessary condition of managing family, its increase leads to decrease in the stress level of the parents. Similarly with rise in the level of education, there is upgradation of knowledge component and thus decreases the stress level. Mother is subjected to more stress than the father as concluded in the study. Social support plays a satisfactory mediating role as a predictor between income and stress as concluded in the model fit. The model proposed in the study shows a good fit.

**Conflict of Interest** – No

**Ethical Clearance** – Data from the participants were obtained after taking their consent to participate in the research work. Ethical clearance was obtained from the departmental ethical committee.

**Source of Funding** – Self

**REFERENCES**


Risk of HIV Infection among Tuberculosis Patients of Jaintia Tribes, Meghalaya

Arpita Mitra¹, Roumi Deb²
¹Research Scholar, ²Professor and Addl. Director, Amity Institute of Anthropology, Amity University, Sector-125, Noida, Uttar Pradesh, India

ABSTRACT

Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) co-infection is associated with special diagnostic and therapeutic challenges and constitutes an immense burden on healthcare system of heavily infected countries like India. The association of TB with HIV is twofold; and HIV infection being the most potent risk for a latent TB infection to convert to active disease. Aim of the study is to understand the risk factors associated with HIV infection among the TB patients of Jaintia Hills, Meghalaya. The data was collected from 317 TB patients belonging to the age group 15-50 years from different health centres of Jaintia Hills, Meghalaya. Out of all the TB patients, 39 (12.3%) were infected with HIV. The most important risk factors associated with HIV were found to be religion ($p<0.0$), marital status ($P<0.01$), education ($p<0.02$), occupation ($p<0.00$), income group ($p<0.05$). Early detection of TB and HIV co-infection is necessary to facilitate early treatment and ART initiation, thereby strengthening the control of TB and HIV.

Keywords: Tuberculosis, HIV, Co-Infection, Jaintia Hills, Meghalaya.

INTRODUCTION

India is the country with the highest burden of TB. It was estimated that globally around 9.6 million people were infected with TB, out of which 2.8 million cases were reported from India¹. HIV is fuelling the global TB epidemic; the prevalence of this virus in TB patients is a sensitive indicator of the spread of the disease into the general population in many regions². The effect of TB/HIV co-infection is bidirectional and synergistic/aggravating³. Infected with both HIV and TB is one of the world’s leading cause of death. The epidemic of AIDS has accelerated the rates of transmission and mortality due to TB. Although, the incidence of TB/HIV co-infection has decreased slowly with the implementation of antiretroviral therapy (ART), but unfortunately, in recent years globalization with economic and cultural exchanges has contributed to spread these diseases⁴.

Both diseases are intricately linked to malnutrition, unemployment, poverty, alcohol consumption, drugs abuse⁵. Moreover, the prevalence of HIV among TB patients could be more in India, because 42% of these patients are unaware of their HIV status, the other reason being high rate of immigration from other states⁶.

METHOD

A cross-sectional study was conducted among 317 patients receiving treatment for TB at the various health centres (District Tuberculosis Hospital, Civil Hospital, PHC, CHC, UHC) in Jaintia Hills (East and West), Meghalaya. Since, the present study was a part of ICMR funded project entitled “Prevalence and Risk Factors leading to HIV Infection among the Two Tribes of Jaintia Hills, Meghalaya and Ethical clearance for ICMR funded project was sought from Amity University Research Ethics Committee. The patients involved in study were the individual suffering from TB and was registered in the hospital between 2014-2016, all subjects belonged to the age group 15-50 years and belonged to the tribal community of Meghalaya (pnar, biate, khasi, garo). Before data collection written permission was sought from District Medical and Health Officer (DM&HO) and Medical officers (MOs) of all
the health centres. Informed consent was obtained from each patient prior to conduct the interview and gathered information kept confidential. Patients who refused to give consent and who were unable to understand the questions were excluded from the study. Structured schedule was used to collect the demographic data such as age, sex, religion, community, education, occupation, marital status etc. from each patient. Information related to risk factors associated with TB and HIV was gathered. HIV screening was done for all the tuberculosis patients using WHO evaluated “Rapid Test Kit” following NACO guidelines. Statistical analysis was carried out using SPSS V22. Differences between frequencies were tested using Chi-square test (significance level p<0.05). Multivariate analysis was used to evaluate the associated risk factors of HIV infection among the TB patients. Odds ratios were obtained with corresponding 95% confidence intervals.

**RESULTS**

The present study was conducted among 317 patients diagnosed with tuberculosis in Jaintia Hills, Meghalaya and among them 39 (12.3%) respondents were found to be infected with HIV.

**Correlation of socio-demographic parameters with TB/HIV co-infection**

The number of HIV infected TB patients were found to be more in the age group 25-34 years (16.1%) as compared to other age groups and was found to be statistically significant at 5% probability level (p<0.05). Most of the Christian community patients (20.7%) were infected with both TB and HIV while only around 5% Niamtare and Hindu population were infected with TB/HIV co-infectious diseases. Statistical analysis shows a significant variation of marital and HIV status (p<0.05), with increased risk of HIV among unmarried patients (20.3%). Another important parameter for HIV prevention is education, it was observed that the cases of HIV positive were found to be illiterate (9.5%) and 15.2% were informally educated. Around, 10.9% infected cases had their education below or up to secondary (including primary and middle level of education); however, 41.7% patients pursued or pursuing further education after secondary (higher secondary, diploma courses, vocational studies and post graduation level of education). The distribution of educational level among HIV positive and negative was found to be statistically significant (p<0.05). Majority of the HIV infected studied populations were unemployed (36.4%) and belong to lower economic group (16.7%). Statistically significant differences were observed with respect to occupation and economic status between the HIV positives and negative patients (p<0.05).

**Sexual Practices and Behaviour**

In the present study, around 95% of the TB patients were found to sexually active and risk of HIV infection was higher among them (10.7%). Promiscuous sexual behavior (more than one sexual partner) (79.2%) was found in the study population, out of which 13.9% were infected with HIV co-infection. This factor emerged as very important risk factors among TB patients. Although, the association between sexual relationship, numbers of sex partners with respect to HIV status was found to be statistically insignificant (p>0.05). Out of 300 sexually active respondents 33% had history of sexually transmitted disease; among them 18 patients were infected with this viral disease. The association between history of sexually transmitted disease with respect to HIV status was found to statistically significant (p<0.05). Out of 300 sexually active respondents 33% had history of sexually transmitted disease; among them 18 patients were infected with this viral disease. The association between history of sexually transmitted disease with respect to HIV status was found to statistically significant (p<0.05). The study revealed that almost 13% TB patients infected with HIV had not used condom during sexual practices. Moreover, the history of alcohol abuse injectable drug use was found to be 10.8% and 26.1% (respectively). The association between alcohol abuse, intravenous drug use and HIV infection was found to be statistically significant (p<0.05) (Table 1).

**Table 1: Risk Factors associated with HIV infection among the TB patients:**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Patients infected with Only TB</th>
<th>Patients infected with both TB/ HIV</th>
<th>Total</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of other sexually transmitted diseases (n=300)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>81</td>
<td>81.8</td>
<td>18</td>
<td>18.2</td>
</tr>
<tr>
<td>No</td>
<td>154</td>
<td>98.1</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>Don’t know</td>
<td>27</td>
<td>61.4</td>
<td>17</td>
<td>38.6</td>
</tr>
</tbody>
</table>
**DISCUSSION**

The present study indicates the prevalence of HIV (12.3%) among the tribal tuberculosis patients in Jaintia Hills, which is similar to the findings in the states of Odisha, Jharkhand and some areas of West Bengal. In India, the number of HIV cases among TB patients is found to be high in Mumbai (30%), Pune (28.75%) and Mangalore (21%) compared to low prevalence in New Delhi (0.68%), Jammu and Kashmir (1.6%), Aligarh (2.8%), Indore (4%) and Tamil Nadu (4.7%)\(^7\)-\(^12\). The association between marital status, education and HIV infection was found to be significant (p<0.05) in accordance with other studies conducted in all over the world\(^13\)-\(^14\). However, Occupation was also found to be a risk factor for HIV infection in tuberculosis patients, such significant association was observe in other studies\(^15\)-\(^16\). In the present study, a strong statistical significance (p<0.05) was found with respect to sexually transmitted diseases, alcohol abuse and injecting drug use and HIV infection among the TB patients of Jaintia Hills, which is also reported from different parts of world\(^17\)-\(^18\).

The most important risk associated with HIV infection in the present study was religion, education, occupation (high in unemployed, coalmine workers and truck drivers), low-socio economic status, marital status, presence of sexually transmitted diseases, use of recreational substances use such as alcohol before sex and injecting drugs. Whereas, there were no significant association with age, gender, community, multiple sex partners and use of condom though these parameters described as high risk factors in some studies\(^19\)-\(^20\).

**CONCLUSION**

HIV infection is on the rise among TB patients in all over the world. Based on the findings of this study there is a high HIV prevalence in this TB patient population. Majority of the friends of the local tribal people were from Nepal, Bangladesh, Assam, Manipur etc. and some of them were using injecting drugs on daily basis and shared the needles with the others; they at times forced others to use it. This is a great concern especially as it might affect both patient management and public health prospective. In view of associated risk of TB/ HIV co-infection, early detection and treatment of TB and HIV co-infection is necessary along with promotion of condom use and not using substance need to be considered as HIV prevention measures for TB patients in various infection prevention programmes in Jaintia Hills, Meghalaya. It is also very important to make sure the availability of anti-tuberculosis regimens in all Health Centres of Jaintia Hills.

**Conflict-of-Interest:** NA.

**Acknowledgement:** Sincere thanks to ICMR for financial support. We are thankful, to Heads of the Jaintia Hills District Administrative and Health Centers for their support. Heartfelt thanks to the participants of Jaintia Hills for their cooperation in providing the valuable information.

**Ethical Clearance:** The present study was a part of Indian Council of Medical Research (ICMR) funded project, so, the Ethical clearance was sought for the project from Amity University Research Ethics Committee.

**REFERENCES**


Does ICT Influences Rural Government School Teachers Beliefs?-Exploring Teachers Opinion on Usage of ICT as Teaching and Learning Tool

S.Sudha
Associate Professor, School of Management Studies, Vels Institute of Science, Technology and Advanced Studies

ABSTRACT

The world is experiencing quick changes due to outburst of new technologies. These transformations are visible throughout biosphere together with rising countries like India, China, and Indonesia etc. These changes need to embraced by the developing countries in sequence to get better value in education and as well as to strengthen the classroom teaching and learning process.

Objective: The main objective of the study is to identify educators’ viewpoint about advance technology introduction integration in Education

Method: The present survey was conducted in Tirutanni taluk among primary, middle and higher secondary rural government school teachers in order to identify their beliefs on ICT. 200 Questionnaires was distributed and 152 teachers participated in the survey. 48 teachers did not participate in the survey. The response rate for the study was 76%. CFA was used to analyze the research model. The study contributes to the research and fills the research gap of limited studies done in this research area.

Results: The findings reveal that teachers believe that ICT influences teaching and it can use as a teaching and learning tool.

Conclusion: Usage of ICT by teachers leads to quality education.

Keywords: Teachers beliefs, Technology devices, educator and learning tools.

OVERVIEW

The domain is undergoing quick fluctuations due to outburst of new technology software. These transformations are visible throughout biosphere together with rising countries like India, China, and Indonesia etc. These changes need to embraced by the developing countries in sequence to get better value in in education and as well as to strengthen the classroom teaching and learning process. ICT has become a universal theme and information technology has started to revolutionize all countries, reaching every person by giving an end to traditional methods of teaching\textsuperscript{[1]}. Students have their everyday usage in ICT through smart phones, social networks like Instagram, Facebook etc.\textsuperscript{[2]} The frequent challenges seen by the rural teachers are the need of awareness and familiarity how to employ internet and explore data. It discourages teachers from usage of ICT in classroom teaching process\textsuperscript{[3]}. On the other hand the noteworthy changes implemented by rural teachers are changing their traditional teaching methods to application methods in ICT mode. The usage of advance technology in coaching and education process involves advance technology abilities known as ICT education that involves knowledge on fundamental computer operations and practice. Usage of advance technology devices in daily lives has made life easier\textsuperscript{[4]}. Teachers need to use ICT as it is not value addition but it communication; the operation activities of learning and pedagogical improvement\textsuperscript{[5]}. Students have their everyday usage in ICT through smart phones, social networks like Instagram, Facebook etc.\textsuperscript{[5]}
has started to become essential in daily process.

As per the Indian advanced technological devices usage is trendy education and its integration in to classrooms was much stressed in the national policy on education in 2016. But its actual implementation started around 2 decades ago. In 1992 Programme of Action which was formed, stressed on usage of ICT in schools. Various smart schemes were introduced to make educators improve their skills on ICT. Though this initiative did not take up well the usage of SMART resources were started in higher education.

The author has stated that usage of ICT leads to professional development and such technology skills need to be developed by teaching professionals. The researchers in their study communicates teachers attitudes proved to be significantly positive towards the usage of ICT. With these positive attitudes the required skill sets for ICT need to be acquired by the rural school teachers.

MATERIALS AND METHOD

India is one of the fast growing countries in usage of internet. The spread of internet usage among them have seen rapid growth in urban areas when compared to rural. Rural India is still lagging behind in terms of internet services and availability of ICT. As per the census of India 2018, The Indian youth population who are 50% below the age of 25 years are the main users of Information and Communication. The number of internet users in India by 2022 would be 511.89 million. Among the population usage of advanced technology by teachers in the ground of instruction has increased. Both state and central government has also framed policies on usage of ICT. The Education policy 2017-18 of Tamilnadu has also emphasized usage of ICT everywhere. But rural area has been experiencing limited connectivity of internet to urban areas. Various researchers have stated that the degree of digital competence of its teaching staff needs to be increased The researchers have found that teachers are expected to equip themselves with the 21st century skills on computers.

This study was designed to analyze the beliefs of rural government school teachers advanced technology usage as instruction and knowledge tool. The study also helps route and explore about the beliefs on ICT integration in Education.

LITERATURE REVIEW

Educators viewpoint about Advance Technology usage as a Instruction and Knowledge Tool

Teachers are termed as demonstrators and they are the primary factor for implementing development and innovation in education. Their perceptions do play a vital role in implementation of educational technology in improving the performance of the students Among educators (teachers) male members proved to have more confidence in use of ICT to female.

It is also stated that technology has more value when utilized with subjects like mathematics, solving word problems. Some quote Education Technology is effective but its effective usage in classrooms is associated to instructors’ outlooks and their near wisdom.

Educators Beliefs about Technology Integration in Education

The authors in their study has revealed that advance technology viewpoint by educators and its implementation in the area of education.

Aim of the research study

The prime demonstrable aim of the research was to pinpoint educators’ beliefs about ICT as a teaching and learning tool and Integration of ICT in Education.

Resources and method

Tool

This is assessable research learning and data was collected using survey method.

Population

One rural government coeducation school was considered for the study. 200 teachers participated in the survey and structured questionnaire were distributed. 152 teachers participated in the study. 48 teachers did not return the filled in questionnaire.

Data Assessment

Data was assessed using CFA. AMOS software was used version 21.

Research process

Assessment method was engaged to gather the data.
Inquiry forms were distributed to 200 rural government school educators for the force of determining the soundness and consistency of the inquiry tool. The soundness values for individually are: educators’ beliefs about ICT as a teaching and learning tool (0.687), educators’ viewpoint about advance technology usage in education (0.624). People for the real data collection were rural government school educators. Data was analyzed by using CFA with Amos version 21.

RESULTS

Confirmatory factor analysis was done with AMOS 21.0 software version to understand the teachers’ beliefs.

![Diagram 1 showing Confirmatory Factor Analysis](image)

Table 1: Showing significance of the model (Group number 1 - Default model)

<table>
<thead>
<tr>
<th></th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ict</td>
<td>TLT</td>
</tr>
<tr>
<td>TLT1</td>
<td>TLT</td>
</tr>
<tr>
<td>TLT2</td>
<td>TLT</td>
</tr>
<tr>
<td>TLT3</td>
<td>TLT</td>
</tr>
<tr>
<td>TLT4</td>
<td>TLT</td>
</tr>
<tr>
<td>TLT5</td>
<td>TLT</td>
</tr>
<tr>
<td>ICTE1</td>
<td>Ict</td>
</tr>
<tr>
<td>ICTE2</td>
<td>Ict</td>
</tr>
<tr>
<td>ICTE3</td>
<td>Ict</td>
</tr>
<tr>
<td>ICTE4</td>
<td>Ict</td>
</tr>
<tr>
<td>ICTE5</td>
<td>Ict</td>
</tr>
<tr>
<td>ICTE6</td>
<td>Ict</td>
</tr>
</tbody>
</table>

P values correspond to the significance of the relationships between the variables.
The results of the study reveals that the constructs on advance technology usage as a coaching and knowledge tool proved to be significant with alpha value less than p<0.05. The constructs on teachers beliefs on the implementation of ICT in education process is also proved to be significant with values less than p<0.05.

It can also be inferred from above table and diagram that teachers do strongly believe that ICT can be used as a tool of instruction in the subject matter in the curriculum. ICT helps to stimulate critical thinking of the students and it contributes substantially to students teaching and learning process. Hence teachers are strongly convinced is usage of advance technology usage as a coaching and knowledge tool.

The perceptions of educators on advance technology usage in their jobs in an effective manner are proved to be significant in the study. The study also provides insights in to usage of advance technology in the area of teaching will prove to be useful for the society in the future. At the same time teachers too believe that too much usage of ICT usage will isolate students and separate them from learning process. Therefore ICT in usage of education process are believed to be effective but need to be used with caution.

DISCUSSION

The results showed that educators believe that advance technology can be benefited as a teaching and learning tool. Teachers belief on using ICT for management and educators work preparation, ICT contribution as learning tool are significant as per the analysis.

Further in the study, teachers’ beliefs on ICT integration in education are found to be significant. Teachers are interested to involving advance technology in instruction as it improves the teaching and learning process which is relevant to the study done by[14]. Teachers are ready and are always interested in learning new technologies which helps them to enhance their skills in technologies[15].

The study further reveals that rural government school teachers do have negative thoughts and they feel insecure in usage of ICT in education and they do face lot of challenges in using ICT for their respective subjects.

Hence it is important that government should take steps in solving the challenges faced by rural government school teachers by making regular investments in infrastructure facilities in government schools.

CONCLUSION

The study has shed light on two important things like advance technology as a coaching and knowledge tool and secondly ICT introduction in the field of education. The results discussed in the study also prove to be significant. However there are constraints found in ICT implementation practically due to lack of infrastructure facilities. ICT implementation in rural areas will lead to technological and skill enhancement of rural government school teachers and leads to quality education for rural children.

Author contributions: The author has collected the data on her own and she wants to specialize in the area of ICT.

Ethical Clearance: NA

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. A Sife, E Lwoga, C Sanga New technologies for teaching and learning: Challenges for higher learning institutions in developing countries.2007;3(2).

2. Yusefee et al The impact of information and communication technology on economic growth: evidence from developed and developing countries, Economics of Innovation and New Technology 2011;20(6).


6. Alcuin Mwalongo Teachers’ perceptions about ICT for teaching, professional development, administration and personal use International Journal
of Education and Development using Information and Communication Technology. 2011;7 (3). p. 36-49.


9. O’Neal, LaToya J.; Gibson, Philip; Cotten, Shelia R Elementary School Teachers’ Beliefs about the Role of Technology in 21st-Century Teaching and Learning, Computers in the Schools, 2017;34(3) p192-206.


Evaluation of Levels of Gunas in Indian Athletes Using Prakriti Concept

Tarun Jain¹, Ritu Sharma¹, Abha Singh², Karuna Mehta³
¹Research Scholar; ²Lecturer, Amity Institute of Psychology and Allied Sciences, Amity University Noida, UP; ³Associate Professor, Zakir Hussain College, Delhi University

ABSTRACT

Background: Our civilization has always recognized extraordinary individuals, whose performance in sports, arts, and science is vastly grander to that of the rest of the population. The present study was conducted to assess the levels of gunas of Indian athletes at three levels using the Prakriti concept.

Materials and method: The present study consisted of 107 school level athletes, 110 college level athletes and 76 Elite level athletes with age group of 15-18 years, 19-24 years and 16-45 years. Mathew IAS Rating Scale was applied. The instrument measures three broad behavioral tendencies (personality components, dimensions): Inertia (Tamas), Activation and Stability. Partial least squares structural equation modeling (PLS-SEM) approach was used to assess the coefficient regression values of the individual contributing factors to total personality values.

Results: Factor loadings of all items presence of convergent validity. At school level stability was found to be negative with β= -0.494, activation was found to be positive with β= .352 and Inertia (Tamas) was found to be positive. Activation was found to be positive with β= .45 and Inertia (Tamas) was not significant in the elite athletes and negative. Conclusion: The performance of Indians at international level has been very mediocre and understanding the personality from school to elite level being predominantly result oriented (Rajas) can help in changing the approach at grass root level.

Keywords: Athletes, Gunas, Prakriti.

INTRODUCTION

Personality has been defined as “psychological qualities that contribute to an individual’s enduring and distinctive patterns of feeling, thinking and behaving”¹ whereas successful performance is defined as having both the development and mastery of knowledge, skills, and abilities and the capability to consistently and reliably deliver (i.e., perform) at the time of performance.²

Our civilization has always recognized extraordinary individuals, whose performance in sports, arts, and science is vastly grander to that of the rest of the population. Assumptions on the causes of these individuals’ astonishing abilities and performance are as old as the first records of their achievements.³

Type based assessments in which personality has been assessed by categories an individual as one type or another. This fails to support the concept of “type” (e.g. introvert or extravert) as successful athletes have been both introverts and extroverts as shown in various researches. Thus type fails to support the concept of “type”.⁴ Samkhya theory of personality on the other hand provides the assessment of each individual of their present state and steps to proceed to next level in relation to traits to improve performance.⁵

Samkhya theory of personality shows the insights in accepting human nature as per Indian thoughts. Various Indian researchers have also deliberated on this concept
of Triguna in their writings.

The Triguna concept shows the great teacher of classical yoga, Patanjali, says (Yoga Sutras II.18), “The world of objects is composed of the three gunas—the principles of illumination (Sattva), Activation (Rajas) and Inertia (Tamas).

The guna are of three kinds and are present in all individual at all the time and these gunas act together and never exist in isolation. Based on the above understanding, personalities are categorized into three, viz., Stability (Sattvic), Activation (Rajasic) and Tamasic types. Individuals differ in their cognitive, affective, and personality aspects according to interplay of Triguna.

Guna has its own effect on the intellect and action. Each guna has a balanced and positive state and excess or negative state.

**Stability (Sattva) Guna**

From the Bhagavad Gita (14.6): “Of these three, sattva, untainted, luminous, free from sorrow, binds by means of attachment to knowledge and joy.” As balanced state: Stability (Sattvic) quality has been described as being “free from attachment and vanity and absolutely unruffled in success and failure.” In excess Stability (Sattvic) generates self-righteousness, complacency and self-satisfaction. That means happy in finding the solution but not acting on it when required.

**Activation (Rajas) Guna**

From the Bhagavad Gita (14.7): “Activation (Rajas) is marked by passion born of craving and attachment; it binds the embodied Self to never-ending activity. “Activation (Rajas) is described as an intermediary between Inertia (Tamas) and Stability (Sattva).”

**Inertia (Tamas) Guna**

From the Bhagavad Gita (14.8): “Tamas, ignorance-born, deludes all embodied beings; it binds them by means of dullness, indolence and sleep.” Tamas present in a balanced state represents qualities such as ease, loyalty, patience, stability and being grounded. Shutting down or coming to rest brings forgetfulness and possibility of renewal.

The present study was done to assess the reasons for poor performance of Indian athletes at international level using the Triguna concept with objective to assess the levels of gunas of Indian athletes at three levels using the Prakriti concept.

**MATERIAL AND METHOD**

The present study includes purposive sample of school level athletes (n=107), college level athletes (n=110) and Elite level athletes (n=76). The study protocol was approved from institutional ethical committee. All participants were informed and written consent was obtained. The participants in interschool and intercollegiate meet belonging to various states. Elite athletes were representing India at international level.

Age group of school level was 15-18, college levels were from 19-24 and elite level age varied from 16 to 45. Mathew IAS Rating Scale was applied. The instrument measures three broad behavioral tendencies (personality components, dimensions): Inertia (Tamas), Activation and Stability. They cut across cognitive, temperament and motivational modalities. It contains 35 items and allows the subject to discriminate and assess type and strength of guna for each questionnaire. Reliability was established as standardization details for athletes’ assessment was not found in the literature.

**STATISTICAL ANALYSIS**

The obtained data was statistically analyzed using IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp. Partial least squares structural equation modeling (PLS-SEM) approach was used to assess the coefficient regression values of the individual contributing factors to total personality values.

**RESULTS**

Table 1 indicates Reliability and Validity. Here Cronbach’s Alpha (CA) - Values of all the constructs exceeds or equivalent to the level of 0.75. rho_A Reliability – Measure of consistency all values greater than .75 Composite Reliability (CR) – All the values in the above table are greater than .75. Factorial Validity - Factor loadings of all items in the present study are more than 0.5, thus indicating presence of convergent validity.
Figure 1 indicates Measurement Model Diagram showing the contribution of three broad behavioral tendencies personality components: Inertia (Tamas) (I), Activation (A) and Stability (S).

Table 2 indicates school level athletes displaying mean score of significant Regression (β) path coefficients, T statistics and p values obtained by estimating standard errors for the estimates—School athletes. The values are highly significant. At school level: Stability was found to be negative with β = -0.494 (p = .000*), activation was found to be positive with β = 0.352 p*** highly significant and Inertia (Tamas) is found to be positive with β = 0.279 (p = .000*)

Table 3 indicates for college level Athletes displaying mean significant Regression (β) path coefficients, T statistics and p values obtained by estimating standard errors for the estimates—College athletes. The values are statistically significant. At college level stability was found to be negative with β = -0.46 (p = .000*), Activation is found to be positive with β = 0.19 (p = .000*) and Inertia (Tamas) is found to be positive with β = 0.45 (p = .000*)

Table 4 indicates Elite International Level Athletes which Displaying significant Regression (β) path coefficients, T statistics and p values obtained by estimating standard errors for the estimates—Elite athletes. At Elite level: Stability is found to be negative with β = -0.46 (p = .000*), Activation is found to be positive with β = 0.45 (p = .000*) and Inertia (Tamas) is not significant in the elite athletes and negative with β = -0.09 (p = 0.31).

Table 5 indicates Trend of Triguna at three levels of sports in India where Trend of the three personality aspects vis. Inertia (Tamas), Activation (Rajas) and Stability (Sattvic) for the three distinct levels of sports (School, College & Elite) was compared. It indicates Stability is highly significant however perceived negatively at all three levels. Activation is highly significant and is perceived positively however activation is high at school level and highest at Elite level. Inertia (Tamas) is only significant at school and college level and not significant at elite level. Stability was found to be similar at all three levels. Activation was highest at the elite level and Inertia (Tamas) was found to be highest in college level.

**Table 1 Reliability and Validity**

<table>
<thead>
<tr>
<th>Personality Components</th>
<th>Cronbach’s Alpha</th>
<th>rho_A</th>
<th>Composite Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School Level Athletes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activation</td>
<td>0.749</td>
<td>0.806</td>
<td>0.788</td>
</tr>
<tr>
<td>Inertia (Tamas)</td>
<td>0.742</td>
<td>0.779</td>
<td>0.775</td>
</tr>
<tr>
<td>Stability</td>
<td>0.823</td>
<td>0.85</td>
<td>0.851</td>
</tr>
<tr>
<td><strong>College Level Athletes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activation</td>
<td>0.752</td>
<td>0.792</td>
<td>0.79</td>
</tr>
<tr>
<td>Inertia (Tamas)</td>
<td>0.913</td>
<td>0.919</td>
<td>0.923</td>
</tr>
<tr>
<td>Stability</td>
<td>0.894</td>
<td>0.902</td>
<td>0.907</td>
</tr>
<tr>
<td><strong>Elite International Level Athletes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activation</td>
<td>0.968</td>
<td>0.973</td>
<td>0.971</td>
</tr>
<tr>
<td>Inertia (Tamas)</td>
<td>0.856</td>
<td>0.872</td>
<td>0.882</td>
</tr>
<tr>
<td>Stability</td>
<td>0.972</td>
<td>0.974</td>
<td>0.974</td>
</tr>
</tbody>
</table>

*Cronbach’s Alpha (CA)* - Values of all the constructs exceeds or equivalent to the level of 0.75.

*rho_A Reliability* – Measure of consistency all values greater than .75

*Composite Reliability (CR)* – All the values in the above table are greater than .75.
Factorial Validity - Factor loadings of all items in the present study are more than 0.5, thus indicating presence of convergent validity.

Table 2: Displaying significant Regression ($\beta$) path coefficients, T statistics and p values obtained by estimating standard errors for the estimates-School athletes

<table>
<thead>
<tr>
<th></th>
<th>Original Sample (O)</th>
<th>Sample Mean (M)</th>
<th>Standard Deviation (STDEV)</th>
<th>T Statistics (O/STDEV)</th>
<th>P Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation $\rightarrow$ IAS</td>
<td>0.35</td>
<td>0.35</td>
<td>0.03</td>
<td>11.88</td>
<td>0.000</td>
</tr>
<tr>
<td>Inertia (Tamas) $\rightarrow$ IAS</td>
<td>0.27</td>
<td>0.29</td>
<td>0.04</td>
<td>6.455</td>
<td>0.000</td>
</tr>
<tr>
<td>Stability $\rightarrow$ IAS</td>
<td>-0.49</td>
<td>-0.46</td>
<td>0.02</td>
<td>18.836</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 3: displaying significant Regression ($\beta$) path coefficients, T statistics and p values obtained by estimating standard errors for the estimates-College athletes

<table>
<thead>
<tr>
<th></th>
<th>Original Sample (O)</th>
<th>Sample Mean (M)</th>
<th>Standard Deviation (STDEV)</th>
<th>T Statistics (O/STDEV)</th>
<th>P Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation $\rightarrow$ IAS</td>
<td>0.193</td>
<td>0.214</td>
<td>0.044</td>
<td>4.359</td>
<td>0.000</td>
</tr>
<tr>
<td>Inertia (Tamas) $\rightarrow$ IAS</td>
<td>0.453</td>
<td>0.442</td>
<td>0.052</td>
<td>8.743</td>
<td>0.000</td>
</tr>
<tr>
<td>Stability $\rightarrow$ IAS</td>
<td>-0.469</td>
<td>-0.454</td>
<td>0.02</td>
<td>24.003</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 4: Displaying significant Regression ($\beta$) path coefficients, T statistics and p values obtained by estimating standard errors for the estimates-Elite athletes

<table>
<thead>
<tr>
<th></th>
<th>Original Sample (O)</th>
<th>Sample Mean (M)</th>
<th>Standard Deviation (STDEV)</th>
<th>T Statistics (O/STDEV)</th>
<th>P Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation $\rightarrow$ IAS</td>
<td>0.456</td>
<td>0.45</td>
<td>0.05</td>
<td>7.71</td>
<td>0.000</td>
</tr>
<tr>
<td>Inertia (Tamas) $\rightarrow$ IAS</td>
<td>-0.09</td>
<td>0.01</td>
<td>0.09</td>
<td>1.003</td>
<td>0.316</td>
</tr>
<tr>
<td>Stability $\rightarrow$ IAS</td>
<td>-0.51</td>
<td>-0.47</td>
<td>0.20</td>
<td>2.53</td>
<td>0.012</td>
</tr>
</tbody>
</table>
### Table 5: Trend of the three personality aspects vis. Inertia (Tamas), Activation (Rajas) and Stability (Sattvic) for the three distinct levels of sports (School, College & Elite)

<table>
<thead>
<tr>
<th>Personality Components</th>
<th>School Athletes</th>
<th>College Athletes</th>
<th>Elite Athletes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inertia (Tamas) -&gt; IAS</td>
<td>0.279</td>
<td>0.453</td>
<td>-0.096</td>
</tr>
<tr>
<td>Activation -&gt; IAS</td>
<td>0.352</td>
<td>0.193</td>
<td>0.455</td>
</tr>
<tr>
<td>Stability -&gt; IAS</td>
<td>-0.494</td>
<td>-0.469</td>
<td>-0.514</td>
</tr>
</tbody>
</table>

**DISCUSSION**

While assessing the result through the prism of the trigna concept one has to understand the fundamental in using this theory is that all the three gunas, namely Inertia (Tamas), Activation (Rajas), and Stability (Sattvic) are essential and necessary for the functioning of the human mind and body complex. An athlete has to use both his mental skill and physical skills equally and concurrently at a given time. Thus, in sports, the balance of each guna is a must to perform. The study highlights issues present in the Indian athletes based on the Trigna concept of personality.

We observed that the mean values of the gunas in the Indian athlete at all three levels suggest that stability is the most predominant guna, next dominant guna is activation followed by Inertia. However, Sattvic is highly significant at all three levels but have negative regression coefficients.

Stability denotes the quality of intelligence which creates harmony, staying calm, balanced, and control. It has also been shown that staying calm, being balanced and in control are vital traits for successful performance as it lower anxiety levels and improve performance. Higher levels of stability suggest that the Indian athletes are not in favor of approaching the sports in a detached, process-oriented and balanced manner.\(^{11}\)

Activation, on the other hand, has a positive regression coefficient at all three levels suggests that they prefer approaching sport in an enthusiastic, excited, ambitious, alert, passionate, persevering and motivated way which are qualities of elite athletes as shown by various researches.\(^{12}\) However, activation with positive
coefficient and Stability with negative coefficient suggests that excessive activation which is characterized by being overactive, uncontrolled energy, impatient, hasty in planning things for the future, risk-taking, rash, go-getting, acquisitive, aggressive, greedy, competitive, ego-involved assertiveness, dominance, inability to be a follow a process, egoistic, which leads to result orientation, instant gratification and poor performance. It has been shown that too much of motivational level and result orientation narrows the cognitive skill and limits identifying the difference between result orientation and process orientation approaches which leads to failures in motor skills in sports.¹³

Nature of sports activities influence and cultivates different kind of abilities and thinking process among participants personality, group activities results in more social and democratically values, whereas individual activities make them to more rigid and narrow minded. But both nature of sports make sportsperson to have mastery over the emotion and learn how to regulate and control them according to situation. A study by Shankara Murthy¹⁴ revealed that Sattva guna is positively related to organisational setup because Sattvic personality consists of passion, patience, control on behaviour, creative leadership, and intellectual ability.

Prasunavv et al¹⁵ found that Sattvic personality performs better than Rajasic and Tamasic personalities. Authors concluded that trigunas and tridoshas directly control all the physiological processes, and individual motivation and cognitive levels are closely related with Prakriti.

It has been found that inertia (Tamas) is the quality of dullness, ignorance, and Inertia (Tamas) is highly significant however was not found significant in the elite group. The school and college level are still not entirely dedicated to sports as the elite is which justifies the presence of Inertia (Tamas) (tamas) guna in these two groups. Inertia (Tamas) also signifies a lack of knowledge and state of ignorance which will be prevalent at the school level due to lack of experience.¹⁶

This gunas represents Prakriti (personality) which suggest the Indian athlete believes in a more result-oriented approach than to a process orientated approach in sports. Activation which is result oriented approach and instant gratification are negating the Stability guna which is knowledge-based orientation and is the signification of delayed gratification. Sport is a lifelong process and not a onetime event and requires a patient and systematic approach which in the Prakriti concept denotes as Stability (Sattvic) guna.¹⁷ The triguna scale can help each athlete to understand their gunas and that balancing the gunas is the key to consistent performance and any guna in excess leads to poor performance.

**CONCLUSION**

This study will serve to advance understanding and theoretically underpin the personality using Triguna concept to assess and provide intervention to improve sports performance in Indian athlete at individual level. Failures of Indian athletes at international level have not been assessed from individual athlete level rather has been assessed on a national level.

**Conflict of Interest:** NIL

**Financial Support:** NIL

**REFERENCES**


17. Vealey RS. The Conceptualization And Measurement Of Sport-Confidence (Self-confidence, Sport Psychology) (Doctoral Dissertation, University Of Illinois At Urbana-Champaign).
Effect of 8 Weeks Body-Weight Resistance Training on High-Normal Blood Pressure and Stage 1 Hypertension Subjects—Pilot Study to Validate the Protocol

Sonu Punia1, Sivachidambaram Kulandaivelan1
1Assistant Professor, Department of Physiotherapy, GJUST, Hisar, Haryana, India

ABSTRACT

Background: Resistance training has shown to decrease the blood pressure (BP) in Indians, but assessing 1 repetition maximum (1-RM) and use of equipment is difficult for individuals who wants to do it in home. Body-weight exercises are simple yet provide resistance to exercising muscles. Objective: To see the effect of 8 weeks progressive body weight resistance training (RT) on BP in subjects with high-normal BP and stage 1 hypertension.

Materials & Method: A randomized controlled trial was conducted in Hisar, an urban area of Haryana and study was carried out during January to June 2017. 20 patients diagnosed with either high-normal BP or stages 1 hypertension were recruited after screening of inclusion & exclusion criteria. For resistance training (RT) group, participants were exercised 30-40 minutes/session and 3 Sessions/week for 8 weeks. Control group, there was no training for 8 weeks but offered exercise intervention afterwards. Outcome variable was BP which was measured at baseline as well as 2 week intervals thereafter up to 8 weeks. Data was analyzed using IBM SPSS v21.0 software. Results: There was a significant gradual SBP reduction in resistance training (RT) group up to 6 weeks (MD -11.36, p=0.001 at 6 week), but insignificant rise in BP at 8 week (MD -10.85, p=0.03). Resistance training (RT) reduced DBP significantly at 6th week (MD -6.36, p<0.001).

Conclusion: In Resistance training group, current exercise protocol should be modified to reduce BP in this population. Trial Registration: CTRI/2017/03/008280. Source of Fund: None.

Keywords: Resistance training; Hypertension; Exercise therapy; Body weight

INTRODUCTION

Prevalence of cardiovascular disease (CVD) is increasing day by day in developing countries like India. High blood pressure accounts for the greatest proportion of deaths (about 30%) attributed to CVD risk factors in India.1,2 The percentage of risk increase in people with older age, gender, greater Body mass index (BMI ≥ 23 Kg/m²), large waist circumference, sedentary occupation, illiterate envionment, diabetes mellitus and raised urine protein, serum creatinine. In order to abate the burden of hypertension and related health outcomes, it is important to understand and establish the relationships between major risk factors for elevated blood pressure. However, evidence regarding these relationships may not generalizable to developing countries, such as India because most of the evidence from developed countries.3,4 Lack of awareness about hypertension, risk factors of hypertension (HTN), diet modification and treatment choice are important cause of increased prevalence. With increases in rate of literacy, rate of prevalence of hypertension decreased, thus education and community-based screening should be considered as having a potential role in controlling HTN in India.3,5

Early screening of hypertension and development of affordable intervention program (pharmaceutical
and nonpharmacological treatment) is the need of time. One important part of non pharmacological treatment is exercise training that improves blood pressure. There are different types of exercises which may effectively to lower blood pressure (BP). Some other researcher also found benefits of physical activity and aerobic training in lowering blood pressure more than regular walking. \(^6\) The results of various meta-analytical studies showed that isometric & dynamic resistance exercise and aerobic exercise does lower BP however, the sample sizes of the trials to date are generally small. \(^8\) Resistance training has shown to decrease the blood pressure (BP) in Indians, but assessing 1 repetition maximum (1-RM) and use of equipment is difficult for individuals who wants to do it in home. Body-weight exercises are simple yet provide resistance to exercising muscles. In western countries, Nascimento et al et al (2014) suggested that 14 weeks of resistance training has positive effects on functional capabilities and limitations of the elderly by increasing muscular strength, cardiovascular function, decreasing coronary artery disease (CAD) risk, and preventing hypertension but Juliano Casonatto et al (2016) found that a single bout of resistance exercise can have a BP-lowering effect that last for up to 24 hours. \(^12\) But the effect of dynamic resistance protocol is yet to be noticed in India. There are some resistance protocols that differ in periodization, volume, intensity, and training frequency. These contributing factors vary the control of BP in during short and long-term training periods. Hence there is need of an effective resistance training (RT) protocol that can be used to prevent and treat high blood pressure. Therefore, the objective of the study was to develop an effective resistance exercise protocol for the Indian community.

**METHODOLOGY**

**Study design**

A randomized controlled trial was conducted in Guru Jambheshwar University of Science & Technology (GJUS&T), Hisar situated in an urban area of Haryana. Participants were recruited from local hospitals and department of Physiotherapy, GJUS&T. Patients were selected by stratified random sampling and randomized into two groups: a control group (n=10) and resistance group (n=10). Since it was pilot study so sample size was not calculated.

**Inclusion and exclusion criteria**

The inclusion criteria for the study was any males or females of middle aged adults of 30-45 year, who was apparently high normal BP and stage 1 hypertensive diagnosed by physician and passed physical activity ready questionnaire (PAR-Q) developed by American Cardiology Society of Medicine and were willing to participate in the study. The exclusion criteria for the study if were chronic alcoholic or were having any other pathological conditions such as Musculoskeletal conditions, Neurological conditions and Cardio-respiratory conditions that prevent the subject to perform exercise training.

**Ethical consideration**

Ethical approval for the study was obtained from the institutional ethical committee of GJUS&T, Hisar vide letter no PTY/2016/555 on 14/10/2016. We followed Helsinki guidelines (1964) because our study was on human subjects. Present study protocol was also registered under clinical registry trial (CTRI/2017/03/008280).

**Randomization and allocation concealment:** Urban area was divided into four blocks and each block has five wards. After that physiotherapist randomly select one ward from each block by chit method. Physiotherapist recruited 1 participant randomly by her convenience. Recruitment for the study was restricted by block allocation (3 males and 3 females each in high normal BP and stage II hypertension) through order selection means first come and first selection. Same sequence of selection of participants was followed in each block. All participants were blinded to the treatment and also assessor was also blind to the treatment. Hence present trial was a double blinded, randomized and active controlled trial.

**Procedure**

The participants were asked for their consent prior to participating in the study. The participants were assured about the confidentiality of the information provided. 20 patients diagnosed with high normal BP (n=10, 5 male & 5 female) and stage 1 hypertension (n=10, 5 male & 5 female) were recruited from Department of Physiotherapy, G.J.U.S. & T., Hisar, by referral from the hospitals. A trained hospital staff and trained physiotherapy lab technician measured baseline data for various outcome measures for all subjects before the start.
of the treatment process. Participants followed their usual medical treatment during the course of this study. Blood pressure and heart rate of the subjects was measured by using a Dr Morepen Blood Pressure Automatic Monitor Model. According to WHO 2013, subjects were asked to remain seated, positioning their left arm level with their heart, taking three measurements with at least a one minute gap between each measurement. In this study, mean systolic and diastolic BP were calculated using the average of three measurements. The four stages are normal blood pressure Stage (SBP≥120-129 mmHg; DBP≥80-89 mmHg), high normal HTN (SBP≥130-139 mmHg; DBP≥80-89 mmHg), Stage 1 HTN (SBP≥140-159 mmHg; DBP≥90-99 mmHg) and Stage 2 HTN (SBP≥160 mmHg; DBP≥100 mmHg).

Protocol

For Resistance training group, an experienced physiotherapist taught different types of exercise to the participants and after that they have done exercise in home based setting. Participants exercised 3 times per week for 8 weeks. Each session started with a 5 min warm up followed by eight exercises for major muscle groups- Push Up, Squatting, Sit-Up, Hamstring Curls, Trunk Extension in Quadrepod Position, Shoulder Press, Heel Raises and Bridging using body weight in sequence and followed 5 min cool down. Participants had performed 3 sets of each exercise per session. The progressive resistance training (PRT) protocol was designed to provide progressive increase in volume (6-8 repetition in first 2 weeks, 8-10 repetitions in next 2 weeks and 12-15 repetitions in last 2 weeks) and change in positioning (showing in Table 1-Annexure A). Participants of control group did normal daily activities without any specific training. Post intervention data was collected after completion of eight weeks of intervention for all outcome measures.

Table 1: 8 weeks resistance training Protocol

<table>
<thead>
<tr>
<th>Type of Exercise</th>
<th>1-2 weeks</th>
<th>3-4 weeks</th>
<th>5-6 weeks</th>
<th>7-8 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push up</td>
<td>Wall push up</td>
<td>Table push up</td>
<td>Ground push up</td>
<td>Push up with weight</td>
</tr>
<tr>
<td>Squatting</td>
<td>Wall squat</td>
<td>Free squat</td>
<td>Lungen</td>
<td>Lungen with Weight</td>
</tr>
<tr>
<td>Sit-up</td>
<td>Sit-up with hand on side</td>
<td>Sit-up with hands on chest</td>
<td>Sit-up with hand behind neck</td>
<td>Sit-up with weight</td>
</tr>
<tr>
<td>Trunk Extension in Quadrepod</td>
<td>Trunk Extension in Quadrepod with hand raise</td>
<td>Trunk Extension in Quadrepod with leg raise</td>
<td>Trunk Extension in Quadrepod with hand &amp; leg raise</td>
<td>Trunk Extension in Quadrepod with weight</td>
</tr>
<tr>
<td>Pull Up</td>
<td>Partial 50% BW*</td>
<td>75% BW*</td>
<td>100% BW* (Full hanging)</td>
<td>100% BW* (Full hanging)</td>
</tr>
<tr>
<td>Heel Raises</td>
<td>B/L** Heel Raises</td>
<td>U/L*** Heel Raises</td>
<td>U/L*** Heel Raises with weight</td>
<td>U/L*** Heel Raises with weight</td>
</tr>
<tr>
<td>Bridging</td>
<td>B/L Bridging with 10 sec hold</td>
<td>B/L Bridging with 20 sec hold</td>
<td>U/L Bridging with 5 sec hold to each leg</td>
<td>U/L Bridging with 10 sec hold to each leg</td>
</tr>
</tbody>
</table>

*BW-body weight; **B/L-Bilateral; ***U/L-Unilateral

Data analysis

Data were analyzed using IBM SPSS v21.0 software. An independent-samples t-test was conducted to compare the two groups (resistance and control). For a repeated measures design ANOVA test had been used. Results were explored as mean±SD. Data was reported with mean difference (MD) along with 95% confidence interval. Significant level set at “p≤0.05”.

RESULTS

All participants were middle aged with age in between 30-45 years. Demographic details of participants were shown in table 2 (Annexure-A).
Table 2: Descriptive statistics of demographic characteristics

<table>
<thead>
<tr>
<th>Group</th>
<th>Variables</th>
<th>Age (years)</th>
<th>Height (cm)</th>
<th>Weight (kg)</th>
<th>BMI**</th>
<th>WC*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance training</td>
<td>Mean±SD</td>
<td>42.30±5.31</td>
<td>164.77±5.81</td>
<td>69.80±6.28</td>
<td>25.76±2.59</td>
<td>35.10±2.02</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>17.00</td>
<td>15.22</td>
<td>18.00</td>
<td>6.00</td>
<td>9.30</td>
</tr>
<tr>
<td>Control group</td>
<td>Mean±SD</td>
<td>39.80±3.22</td>
<td>166.06±12.5</td>
<td>68.20±12.23</td>
<td>24.59±2.38</td>
<td>35.10±2.60</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>10.00</td>
<td>30.48</td>
<td>38.00</td>
<td>8.50</td>
<td>8.00</td>
</tr>
</tbody>
</table>

*WC-waist circumference; **BMI-Basal metabolic rate

There was a significant gradual SBP reduction in resistance training (RT) group up to 6 weeks (MD -11.36, p=0.001 at 6 week), but insignificant rise in BP at 8 week (MD -10.85, p=0.03). Resistance training (RT) reduced DBP significantly up to 6th week (MD -6.36, p<0.001). When the resistance training (RT) results were compared with control, there was no statistically significant difference in BP (p>0.05).

In repeated measure of resistance group, when we compared Baseline SBP to 2nd week SBP (MD 27, p≥0.01; 95% CI -3.80-3.26), 4th week SBP (MD 7.82, p≤0.01; 95% CI 1.74-13.9), 6th week SBP (MD 11.36, p≤0.01; 95% CI 5.70-17.02) and 8th week SBP (MD 10.85, p≥0.01; 95% CI 1.28-20.4) then result is highly significant in contrast to control group up to 6th week but rise in BP seen after 6th week to 8th week. When we compared baseline DBP to 2nd week DBP (MD 0.0, p≥0.01; 95% CI -1.72-1.72), 4th week DBP (MD 3.18, p≥0.01; 95% CI -2.69-9.05), 6th week DBP (MD 6.36, p≤0.01; 95% CI 4.13-8.60), 8th week DBP (MD 2.24, p≥0.01; 95% CI -3.53-8.02) then result is highly significant in contrast to control group at 6th week only.

**DISCUSSION**

The aim of study was to develop an exercise protocol for adults. Initially during 2 weeks, SBP and DBP rise because of the exercise pressor reflex to the cardiovascular center in the medulla from proprioceptors (mechanoreceptors and metaboreceptors) in active muscles. Arterial pressure rises to overcome the resistance to muscle perfusion caused by elevated intramuscular pressure interrupting arterial blood flow.13

The present study evaluated the effects of resistance exercise programs without dietary restriction on cardiac fitness variables such as blood pressure and heart rate. The results suggest that there was gradual reduction in SBP and DBP in resistance training group up to 6 weeks and was significant but during 6-8 weeks result is inconsistent (some patient’s showed decrease in BP but rest showed increase in BP and the result was nonsignificant). The possible reason for this may be due to progression in intensity of exercise and it is not optimal for some patient. The findings of this study about the response of SBP and DBP to this resistance exercise protocol corroborate the results of Wilborn et al demonstrated that the BP is significantly higher after 85% of 1 RM than 65% of that 1 RM. They found no significant differences in the response of SBP between exercising at 65 and 85% of 1 RM.14 The results of this study suggest that reasons other than mechanical compression and Valsalva maneuver may be the cause of the increase in BP due to the fact that 1 RM caused minor responses in BP and they concluded that the longer duration of exercise at 65% of 1 RM is most likely to cause the largest increase in SBP and HR at this intensity. Our study findings also supported by Mota and colleagues found 16 weeks of moderate intensity dynamic resistance training reduced SBP/DBP about 14/ 4 mmHg among 32 older women with controlled hypertension.15 Moraes et al. found 12 weeks of moderate intensity dynamic resistance training reduced SBP/DBP approximately 16/12 mmHg among 15 middle-aged men with hypertension.16 These findings suggest that moderate intensity and duration of dynamic resistance training may be viable as stand-alone antihypertensive lifestyle therapy among adults with hypertension.17

Strength of our study was stratification of sample i.e we included male & female hypertensive and high normal BP and stage 1 hypertensive patients, so results can be generalized to middle aged populations. To the best of our knowledge, we are first to study home based intervention in community dwelling hypertensive so this intervention saved time and benefit patients.
Limitation of our study was that duration of our study was relatively short for home based training but it was not possible to do long duration study in community and training of patients was not monitored although we had demonstrated it properly before start of treatment. But as there was significant reduction in blood pressure in resistance training group, result confirmed that patients had done it properly.

CONCLUSION

The results of the present study indicate that resistance training protocol is significant up to 6 weeks in reducing resting blood pressure but during 6-8 weeks increase in BP revealed that volume or repetition of body weight resistance training exercise overload the patients so repetition and intensity of exercise should be remained same as in 4th to 6th week. Hence we used this protocol as a preventive measure in patients who are at risk of prehypertensive and used in stage 1 hypertensive.

Conflict of Interest: There is no conflict of interest.

Source(s) of support: Nil

Registration number in case of a clinical trial: CTRI/2017/03/008280

Conflicts of Interest: None

REFERENCES

15. Mota MR, Oliveira RJ, Terra DF, Pardono E, Dutra


Management of Patient with Metabolic Encephalopathy – A Case Study

Ranjana Chavan¹, Manisha Vikrant Mistry²

¹Nursing Tutor, ²Asst. Professor, Symbiosis College of Nursing, Symbiosis International Deemed University, Pune

ABSTRACT

The Metabolic Encephalopathy is a series of neurological disorders caused by systemic illness, such as diabetes, liver disease, renal failure and heart failure. Metabolic encephalopathy usually develops acutely or sub acutely. If left untreated, however, metabolic encephalopathy may result in secondary structural damage to the Brain. A 43 year-old patient was admitted to the ICU in a confused state with complaints of dyspnoea and weakness. On the day of admission, he complained of dry cough, fever, sore throat since 5 days accompanied by body ache, weakness and multiple episodes of vomiting since a day. On investigation, traces of ketones were detected in Urine and had increased PT-INR. Throat swab indicated Fungal stains. He had high fever and tachycardia. Tracheostomy was performed and was put on Ventilator to improve his respiratory functions. Nebulization was initiated BD. The case was reviewed for 5 days. His prognosis was very poor and deteriorating. His relatives were informed about his condition and the symptomatic treatment was continued.

Keywords: Metabolic, encephalopathy, unconscious.

INTRODUCTION

Encephalopathy is a difficult term because it can be used to denote either a disease or finding.¹

The word metabolic encephalopathy was used for the first time in 1912 when Kinner Wilson tried to explain the state of global cerebral dysfunction. It is caused by systemic stress, that can vary in the clinical picture from a very mild disorder to a deep coma state with decerebrate rigidity.²

Metabolic encephalopathy is defined as a diffused cerebral dysfunction, typically manifesting as changes in cortical functions and as disorders of consciousness, ranging from confusion to coma.³ Others have suggested that metabolic encephalopathy is a temporary or permanent illness, more a symptom than a disease. It includes various forms of pathological conditions that are predominantly manifested by disorders of mental functioning. However, metabolic encephalopathy may also be defined as a systemic disorder with diffuse brain damage affecting the hemispheres, brain stem, and reticular activating system.⁴

Epidemiological and Demographic Data

Encephalopathy correlates with age. The number of patients with encephalopathy increase after the age of 65 years. People older than 75 years, who reside in nursing homes have 60% chance of developing encephalopathy, whereas in a population younger than 55 years, this proportion is 1.1%.⁵,⁶ Encephalopathy occurs in 10–40% of hospitalized patients older than 65 years, whereas 8–70% of patients develop septic encephalopathy. According to a data from the United States, encephalopathy is being registered in 100–200,000 patients with anoxia and 12–16% of patients with thiamine deficiency, every year. In patients with cirrhosis, the development of hepatic encephalopathy is noted to be in 45–80% of cases, depending on the severity of liver damage.⁵,⁶

Etiology

Causes like Hypoxia, Ischemia, systemic disease, and toxic agents hepatic and renal insufficiency, pancreatitis, malnutrition, electrolyte imbalances sepsis, infection, vasculitis, and malignancy are common in majority of
the cases. Metabolic encephalopathy may also occur as a result of various toxic agents such as alcohol, sedatives (barbiturates, narcotics), psychiatric agents (tricyclic antidepressants, anticholinergics, phenothiazines), heavy metal poisoning, organic phosphates, and other drugs (anticonvulsants, corticosteroids, penicillin, etc.).

**Case Presentation of Metabolic Encephalopathy**

A 43 year-old male patient was admitted to Intensive Care Unit in a confused state with complaints of dyspnoea and weakness. On the day of admission, he complained of dry cough, fever, sore throat since 5 days accompanied by body ache, weakness and multiple episodes of vomiting for 1 day. His medical history includes Diabetes, Hypertension and Hypothyroidism. Due to deteriorating condition manifested by irrelevant talk & breathing difficulty, he was shifted to Intensive Care Unit. The patient was thoroughly assessed; he was disoriented, had dyspnoea and high-grade fever. On investigation, traces of ketones were detected in Urine and had increased PT-INR. Throat swab indicated Fungal stains. A Rapid Sequence Intubation (RSI) was performed and patient was put on ventilator support to maintain respiratory function when he failed to maintain the saturation with CPAP. The patient was cautiously monitored and all the parameters were investigated as per the protocols.

**Day 1**

The patient presented with the complaints of dry cough, fever, sore throat since 5 days and accompanied by body ache, weakness and multiple episodes of vomiting since 1 day. He is a known case of Diabetes, HTN & Hypothyroidism. He had high fever 104.50F, Pulse – 140 beats/min and other vital parameters were normal. Patient was put on medications such as Tab Triolmesar 20 Mg OD, Tab Dimicron XR 60 OD, and Cap. Rifit CD OD. He was also put on IV fluids to correct the electrolyte imbalances.

**Day 2**

Patient shifted to Intensive Care Unit as his condition got worse with repeated dyspnoea & exhibited irrelevant talks. The patient was thoroughly assessed; he was conscious, irritable, confused, and had breathing difficulty. On examination there was a layer of pus formation on the buccal mucosa. His vitals were not stable with parameters like; temperature (1030F), Pulse (120 beats/min) and respiratory rate (24 breaths/min). His urinalysis reports depicted the positive for ketone bodies, elevated PT-INR and RFT values. His HbA1c level was 8.7. Pus drained and sent for investigation. He was put on CPAP to improve his respiratory functions and a RT was inserted for enteral feeding.

**Day 3**

Patient had altered levels of consciousness with dysarthria but was able to express in writing. ABG analysis & Blood sugar was monitored every 4 hours. There was no significant difference in hemodynamic parameters. Gradually his condition worsened and he became unconscious. The congestion in throat increased due to abscess formation and inflammation and later festering was seen. Due to this, RSI was performed and patient was put on ventilator. Nebulization was initiated BD. The prognosis was intimated to his relatives.

**Medical Management**

**Treatment**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Name of the Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Inj. Pan : 40mg OD</td>
</tr>
<tr>
<td>2.</td>
<td>Inj Paracetamol: 1gm TDS</td>
</tr>
<tr>
<td>3.</td>
<td>Inj Monocef: 2gm BD</td>
</tr>
<tr>
<td>4.</td>
<td>Inj Levoflox: 750mg OD</td>
</tr>
<tr>
<td>5.</td>
<td>Inj Optineuron : OD</td>
</tr>
<tr>
<td>6.</td>
<td>Inj Mucomix 1gm IV</td>
</tr>
<tr>
<td>7.</td>
<td>Inj Meropenem: 1gm TDS</td>
</tr>
<tr>
<td>8.</td>
<td>Inj Linid: 600mg BD</td>
</tr>
<tr>
<td>9.</td>
<td>Inj. Doxy: 100mg BD</td>
</tr>
<tr>
<td>10.</td>
<td>Inj Hydrocortizone : 30mg QID</td>
</tr>
<tr>
<td>11.</td>
<td>Inj. Metrogyl: 500mg TDS</td>
</tr>
<tr>
<td>12.</td>
<td>Tab Etilaam: 0.5mg HS</td>
</tr>
<tr>
<td>13.</td>
<td>Tab Allegra M: 130 mg BD</td>
</tr>
<tr>
<td>14.</td>
<td>Tab Azee: 500mg OD</td>
</tr>
<tr>
<td>15.</td>
<td>Tab Ivabrad: 5mg OD</td>
</tr>
<tr>
<td>16.</td>
<td>Tab Eltroxin: 100mg OD</td>
</tr>
<tr>
<td>17.</td>
<td>Tab Triolmesarto: 20mg OD</td>
</tr>
<tr>
<td>18.</td>
<td>Tab Amlong:2.5mg BD</td>
</tr>
<tr>
<td>19.</td>
<td>Tab Triol: 20mg OD</td>
</tr>
<tr>
<td>20.</td>
<td>Tab Towaptan: 1.5mg</td>
</tr>
<tr>
<td>21.</td>
<td>Inj Human Atrapid</td>
</tr>
<tr>
<td>22.</td>
<td>Sy Kesol 10ml</td>
</tr>
<tr>
<td>23.</td>
<td>Sy. Duphalac: 20ml HS</td>
</tr>
<tr>
<td>24.</td>
<td>Neb. Devolin 2.5ml TDS</td>
</tr>
<tr>
<td>25.</td>
<td>Neb. Budecort 0.5mg BD</td>
</tr>
</tbody>
</table>
Fig: 01 - Approach to evaluation of acute confusional state of patient with metabolic encephalopathy

Diagnostic Findings

**Table: 01 – ABG results of the patient**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Investigations</th>
<th>15 Jan 2018</th>
<th>16 Jan 2018</th>
<th>17 Jan 2018</th>
<th>18 Jan 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Na+</td>
<td>128 mEq/L</td>
<td>128 mEq/L</td>
<td>122 mEq/L</td>
<td>124 mEq/L</td>
</tr>
<tr>
<td></td>
<td>K+</td>
<td>3.9 mEq/L</td>
<td>3.9 mEq/L</td>
<td>3.9 mEq/L</td>
<td>3.8 mEq/L</td>
</tr>
<tr>
<td></td>
<td>Cl</td>
<td>97 mEq / L</td>
<td>97 mEq / L</td>
<td>90 mEq / L</td>
<td>103 mEq / L</td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>7.48</td>
<td>7.51</td>
<td>7.39</td>
<td>7.49</td>
</tr>
<tr>
<td></td>
<td>pCO2</td>
<td>24 mmhg</td>
<td>23 mmhg</td>
<td>30 mmhg</td>
<td>32 mmhg</td>
</tr>
<tr>
<td></td>
<td>pO2</td>
<td>143 mmhg</td>
<td>75 mmhg</td>
<td>63 mmhg</td>
<td>65 mmhg</td>
</tr>
<tr>
<td></td>
<td>Hct</td>
<td>45%</td>
<td>50%</td>
<td>38%</td>
<td>41%</td>
</tr>
<tr>
<td></td>
<td>HCO3</td>
<td>17.9 mmol/L</td>
<td>18.4 mmol/L</td>
<td>21 mmol/L</td>
<td>20.5 mmol/L</td>
</tr>
<tr>
<td></td>
<td>HCO3 std</td>
<td>22.0 mmol/L</td>
<td>23.0 mmol/L</td>
<td>25 mmol/L</td>
<td>24 mmol/L</td>
</tr>
<tr>
<td></td>
<td>SPO2</td>
<td>99%</td>
<td>96%</td>
<td>88%</td>
<td>90%</td>
</tr>
</tbody>
</table>

**Table: 02 – Biochemical Test results**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Investigation</th>
<th>Values</th>
<th>Normal Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liver Function Test</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Protein</td>
<td>5.6 g/dL</td>
<td>6.0-7.8 g/dL</td>
</tr>
<tr>
<td></td>
<td>Albumin</td>
<td>2.1 g/dL</td>
<td>3.5-5.5 g/dL</td>
</tr>
<tr>
<td></td>
<td>Globulin</td>
<td>3.5 g/dL</td>
<td>2.5-3.5 g/dL</td>
</tr>
</tbody>
</table>
Transthoracic Echo Report depicted the following findings:

Left Ventricular Hypertrophy
Chamber Dimensions are normal
No regional wall motion abnormality is seen
Normally LV Systolic function; LVEF - 60%
No Pulmonary HTN
Normal Valves
No clots/vegetation/effusion

Impression:
Poor echo window
Left ventricular hypertrophy

DISCUSSION

The 43 year-old male patient admitted in Intensive Care Unit in confused state with complaints of dyspnoea and weakness. On the day of admission, he complained of dry cough, fever, sore throat since 5 days accompanied by body ache, weakness and multiple episodes of vomiting since 1 day. On investigation, traces of ketone bodies was detected in Urine and had increased PT-INR. Throat swab indicated Fungal stains. Patient was put on medications like Tab Triolmesar 20 Mg OD, Tab Dimicron XR 60 OD, and Cap. Rifi CD OD. He was also put on IV fluids to correct the electrolyte imbalances. On 3rd day, Patient’s was in a state of confusion. Gradually his condition worsened and he became unconscious. The congestion in throat increased due to abscess formation and inflammation. An emergency tracheostomy was performed and patient was put on ventilator.

Similar case was encountered with a 29-year old man who presented within the thrombolysis time window to the emergency department (ED) with sudden-onset dysarthria, ataxic and left-sided weakness while smoking cannabis. He was assessed in the ED and found to have a NIHSS of 3. A CT brain scan and extra cranial CTA revealed no significant findings, however, as he was clinically improving, he was not given intravenous thrombolysis. Subsequent MR brain imaging confirmed marked acute bilateral white matter changes typical of drug-induced encephalopathy.

His initial lab investigations were normal. His thyroid function responded well to treatment with Carbimazole, Propanolol and Hydrocortisone and improved rapidly and was discharged with counselling on cannabis use but re-presented twelve hours later with worsening dysphagia, dysphonia, breathlessness and bilaterally weak upper limbs and requiring intensive care support. His symptoms significantly improved and
he was followed up by the endocrinology team.9

**Ethical Clearance**- Taken from the Research Advisory Committee.

**Source of Funding** - Self

**Conflict of Interest** - Nil

**REFERENCES**


Multiple Massive Maxillary Exostoses – A Case Report with Complete Denture Rehabilitation

Ramesh Kumaresan1, Balamanikandasrinivasan C2, Priyadarshini Karthikeyan3, Vini Rajeev4
1 Associate Professor, Academic Unit of Craniofacial Clinical Care, AIMST University, Faculty of Dentistry, Jalan Semeling-Bedong, Bedong, Kedah, Malaysia, 2 Reader, Department of Oral and Maxillofacial Surgery, Vinayaka Missions Sankarachariyar Dental College, Salem, Tamil Nadu, India, 3 Lecturer, Department of Oral Medicine and Radiology, 4 Senior Lecturer, Department of Prosthodontics, AIMST University, Faculty of Dentistry, Jalan Semeling-Bedong, 08100 Bedong, Kedah, Malaysia

ABSTRACT

Exostoses are benign, asymptomatic bony outgrowth arising from cortical bone and occasionally from spongy bone along the maxillary or mandibular arches. They tend to appear in early adolescence and may very slowly increase in size with age. They are not usually a concern to a patient with complete dentition. However, in an edentulous patient they may pose a major concern for denture placement over these areas, leading to pressure and ulceration, which demands their complete surgical excision. The following article presents a rare case of bilateral massive buccal exostoses, which was incompatible with the patient ability of prosthetic rehabilitation and hence a resective osseous surgery was carried out followed by a complete denture rehabilitation.

Key words: Bony outgrowth, complete denture, Exostoses

INTRODUCTION

Natural tooth lost due to various reasons has to be restored by artificial means to rejuvenate the esthetic and functional profile of human face. However, in patients who cannot afford for implants, complete and partial dentures still remains the most popular modality of prosthetic replacement.[1] In situations where bony irregularities such as bony exostoses, tori occur the need for surgical correction becomes mandatory. These anatomical abnormalities which are more common in certain races such as Malaysians tend to remain insignificant in healthy dentition but become enigmatic in edentulism by interfering with denture fabrication.[2] Besides that, these bony prominences can compromise the oral health of the individual by traumatizing the overlying thin soft tissue. Hence the host bed (the alveolar bone and related soft tissues) has to be modified to an extent where the prosthesis can be accommodated without any compromise. Herewith a case of massive exostoses has been presented with complete denture rehabilitation.

CASE PRESENTATION

A 59-year-old, healthy male patient presented for a prosthetic rehabilitation of his missing teeth. On examination, the patient was partially edentulous with few mobile teeth and root stumps, necessitating extraction of the remaining teeth and replacement with a complete denture. Besides, intraoral examination also revealed multiple overgrowths located on the buccal aspect of the maxilla in the premolar and molar areas on the left side and from the canine to molar region on the right side. All the mucosal surfaces over the lesion appeared to be healthy [Figure 1]. On palpation the lesions were bony-hard, lobulated, measuring approximately 2.5 cm x 1.5 cm on either side. The patient had not noticed this mass before since it did not interfere with his speech,
chewing, phonetics or other oral functions. He had no significant past medical history or family history of similar lesions. However, when enquired regarding his dietary habits, being a fisherman, almost every meal included consumption of seafood in various forms.

Radiographic examination showed multiple well-defined radiopaque areas in the premolar and molar region bilaterally [Figure 2]. A maxillary occlusal radiograph also revealed that these masses were the bony thickening of the cortical plate on the buccal surface of the maxilla [Figure 3]. These enlargements of the cortical plate of the buccal surface of the maxilla without any systemic abnormality confirmed the diagnosis of bilateral buccalexostoses.

In view of the complete prosthetic rehabilitation, aresective osseous surgery was planned to excise the bony masses following the extraction of the remaining teeth. After explaining the potential risks and benefits of surgery, an informed consent was obtained from the patient. In the first appointment all the remaining teeth were extracted under local anesthesia. During the second appointment preprosthetic surgery was planned on the right side and in the following appointment surgery was planned for the lesion on the left side. Three weeks elapsed between each appointment.

After giving appropriate local anesthesia, a full thickness mucoperiosteal flap was reflected for a complete access to the exostoses by giving crestal incision and vertical releasing incisions [Figure 4]. Segmental removal of bony exostoses was done with carbide bur under copious irrigation followed by smoothening and debridement of surgical bed (to clear out the osseous debris) with football diamond bur and saline irrigation [Figure 5,6]. The flap was sutured with 3-0 black silk. Pressure was given on the operative site with wet gauze to prevent fluid accumulation and also to facilitate adhesion of periosteum to the underlying bone. Routine postoperative instructions were given. Medications including systemic antibiotics and analgesics were prescribed. The sutures were removed after 1-week. As healing was uneventful bilaterally, [Figure 7] patient was recalled for complete denture rehabilitation after 4 weeks [Figure 8].
An exostosis is a benign, localized, peripheral overgrowth of bone which frequently occurs in long bones where tendons and muscles are inserted. In the jaw bones it may be a nodular, flat or pedunculated protuberance located on the alveolar surface. Maxilla is shown to exhibit the highest prevalence rate of 5.1:1 in comparison to mandible and a male predominance with an incidence of 1.66:1 among the genders. Prevalence of exostosis varies greatly depending on the population studied, with higher incidence in mongoloids than in Caucasoid. Depending on the anatomical location they are termed as torus palatinus (midline of the hard palate), torus mandibularis (lingual aspect of mandible), or buccal/palatal bone exostoses.\(^3\)

Buccalexostoses occur along the buccal aspect of the maxilla or mandible, usually in the premolar and molar regions yet occasionally they may occur in other parts of the jaw. Palatal exostoses are found on the palatal aspect of maxilla, most commonly in the tuberosity region.\(^3\) These exostoses may present either as a smooth bulging of the bone surface continuous with the adjacent area or as discrete, multilocular spherical projections with a broad base that forms a nodular cluster in the similar form noted in our patient.\(^4\)

Glickman and Smulow further classified buccal alveolar bone enlargement into exostosis and lipping. Though their etiology is unclear, the authors considered it as buttressing bone formation in response to trauma from occlusion and suggested that bone formation occurs to reinforce bony trabeculae for functional adaptation.\(^5\)

Though the etiology of exostosis has been investigated by several authors, no consensus has been reached. Several authors have postulated the etiology to be multifactorial where there is an interaction of genetic and environmental factors, masticatory hyperfunction and continued growth.\(^3\) Gorsky et al. postulated that the etiology of osseous outgrowth might be multifactorial, including environmental factors acting in a complicated and unclear interplay with genetic factors. The quasi-continuous genetic or threshold theory states that the environmental factors must first reach a threshold level before the genetic factors can express themselves in the individual; hence both genetic and environmental factors determine expressivity, making the etiology multifactorial.\(^5\) Literature reveals that the prevalence of these bony enlargements increases with age, indicating a relationship between age and their occurrence.\(^6\) It has also been theorized that because some of these outgrowths are found with some frequency during the middle phase of life, suggesting an environmental and functional factors, particularly those related to masticatory stress.
A correlation between the presence of these bony
enlargement in patient with parafunctional habits
has also been demonstrated. Other causative factors
include dietary habits (taking supplements or food rich
in calcium) and nutritional disturbances.[7] Eggen et
al. suggested saltwater fish consumption to be related
to these on outgrowths, probably due to higher levels
of polyunsaturated fatty acids and Vitamin D that is
involved in bone growth.[8] In our patient, it was difficult
to distinguish the true origin of the exostoses since it was
on an edentulous region, presence of few attrited teeth
and consumption of seafood may suggest masticatory
hyperfunction and saltwater fish consumption as
cofactors in origin of the exostoses.

Patients with exostoses seldom complain of
unaesthetic appearance, speech difficulties due to limited
tongue movement and food lodgment leading to malodor.
Few patients may experience trauma or ulceration when
masticating hard or sharp food as the mucosa covering
the bony protuberances is reported to be thinner than the
surrounding mucosa.[9] Hence, when a patient presence
with exostoses the overlying mucosa might have a
normal appearance, but may appear whitish or ulcerated
if exposed to any trauma. Furthermore, recording oral
impressions and seating of dentures are difficult in these
patients.

The diagnosis of a buccalexostosis is generally done
by simple clinical examination. However, radiographs
might be required in situations where the bony
protuberances are extremely large, or multiple, or vary
in consistency to rule out underlying bone pathology.
Radiographic appearance will show a normal bony
pattern or a slightly radiodense image with a higher
density than that of the surrounding bone.[9] In our patient,
orthopantomograph and maxillary occlusal radiographs
were taken which revealed multiple radiodense masses
near premolar and molar region bilaterally. Though not
mandatory, few authors have suggested taking a cone-
beam computed tomography as a helpful diagnostic
tool to identify anatomical variations in exostosis.
[10] Additionally, it can also be helpful in assessing the
relationship of the exostosisto maxillary sinus.

Distinction between exostoses and similar pathology
arising from gingival enlargement and bone outgrowths
remains important. Other differential diagnoses include
osteomyelitis, osteoma, osteosarcoma, osteochondromas,
organized subperiosteal hematoma, mature ossifying
fibroma, periosteal osteosarcoma, chondrosarcoma,
sclerosteosis, fibrous dysplasia, Paget’s bone disease.[1]

Patient with multiple bony growths or lesions not
in the classic torus or exostoses location should be
evaluated for Gardner’s syndrome. This autosomal
dominant syndrome shows other features like multiple
osteomas, sebaceous cysts and soft tissue tumours
of skin, intestinal polyposis and multiple impacted
supernumerary teeth.[1] Though our patient presented
with multiple exostoses, absence of other associated
features ruled out the diagnosis of Gardner’s syndrome.

Due to their benign nature, most exostoses do
not require treatment unless any esthetic problems,
functional problems or discomfort in hygiene
maintenance or phonetics are raised by the patient. Other
reasons for surgical intervention include periodontal or
prosthodontics complications.[11] In our case surgical
extirpation was necessary for prosthetic rehabilitation
and hence decided to surgical remove the exostoses.

When treatment is elected, the exostoses may
be chiseled off or removed by bone-burr cutting.
Conservative surgical removal with bone recontouring
is the treatment of choice, with occasional recurrences
expected.[1] Besides, these exostoses masses can be used
as a source of autogenous bone graft for correction of
intraoral bone defects. The possible complications after
surgery include hematoma, edema, wound dehiscence,
oro-antral communication and infection. However, our
patient did encounter any such complications. Biopsy
for diagnostic support is usually not recommended.
However, biopsy of the excised mass shall be performed
if there is any dilemma regarding diagnosis.

CONCLUSION

Rehabilitation of edentulous mouth is an arduous
task especially in the presence of substantial anatomical
interferences. Since in our patient the radiograph depicted
adequate bone between the exostosis and maxillary sinus,
total removal was feasible. Treatment planning and
management often involves multidisciplinary approach
comprising specialties from prosthodontics and oral
surgery. The present case demonstrates that complete
excision of huge exostoses can be accomplished with
predictable results and least postoperative sequela.
Radiographs should be used as an aid wherever necessary
and a segmental approach has been recommended during
surgical removal in the presence of massive exostoses to
avoid oro-antral communication.

Conflicts of Interest: The authors declare that there is no conflict of interest regarding the publication of this paper.

Source of Funding: Self

Ethical Clearance: Ethical clearance has been taken from Institutional Ethical Committee

REFERENCES

A Hybrid Ensemble Classification Approach to Determine the Impact of Asthma in Association with Gastro Esophageal Reflux Symptoms

K.Kasturi 1, S.Prasanna2

1Research Scholar, Department of IT, 2Associate Professor, Department of Computer Applications, VISTAS

ABSTRACT

Objectives: This implementation work focuses on the predicting severity of respiratory problems of asthmatic patients from the dataset of the PFT report with the significant parameters of Gastro Esophageal Reflux symptoms (GER).

Methodology: The pulmonary functionality test (PFT) report of the asthmatic patients is associated with the significant parameters of GER symptoms to determine the impact of GER symptoms on asthma using a proposed hybrid ensemble classification.

Methods/Statistical Analysis: Using R statistical tool a model has been developed for ensemble classification by stacking the SVM and Random Forest algorithms and boosting with the improved Gradient Boosting algorithm.

Findings: It has been identified that the asthmatic patients who have been reported as ‘normal’ or ‘mild’ in the PFT report also have the respiratory problems often and urge for frequent check-ups. This can be due to the implications of significant symptom parameters of GER.

Applications: The outcome of the developed model HMMC describes about the classification accuracy of the applied dataset of the asthmatic patients with GER symptoms and predicts the severity of asthma in asthmatic patients more accurately rather than the outcome of the existing classification techniques.

Keywords: boosting, asthmatic Patients, PFT, GER, ensemble classification, HMMC.

INTRODUCTION

Prediction and assortment of medical datasets serve in reducing the count of diagnostic issues to recognize the diseases there by affording economical solutions for healthcare systems and medical diagnosis software system. Data pre-processing operates an essential role in prime powerful and capable data for data mining. Feature selection aid in contributing essential characteristics for construction of extensive predictive models. The processing of medical data mining has more potential for exploring the hidden patterns in the knowledge sets of the medical domain. These patterns will be used for clinical diagnosing. However, the obtainable raw medical knowledge is heterogeneous and voluminous in nature. This collected information is often integrated to give a user orienting approach to novel and hidden patterns within the information. In my previous work the significant parameters of the GER symptoms have been identified [1]. And this work deals with the implications of the significant GER parameters of the asthmatic patients with their PFT report value. This leads to the way to find the accuracy of the classification prediction.

EXISTING METHODOLOGY

Chun-Rong Huang et al [2] proposed that “GER can be diagnosed by typical symptoms of acid regurgitation or heartburn sensation at the epigastric or mid chest regions”. E.A.Boiler et al [3] proposed that “In western countries, 10–30% of the population experiences symptoms of gastro esophageal reflux (GER)”. Sudha Pandit et al [4] propose that “The prevalence of GER
is primarily based on the acid reflux symptoms and these symptoms are not always present in patients with endoscopic evidence of esophagitis”. D. Vincent et al [5] proposes that “Gastro-esophageal reflux (GER) has been suspected as a causal factor, but the relationship between GER and asthma remains controversial”. The existing work focuses only upon the environmental factors such as living, working environment and parental history as the main causes of respiratory diseases [6]. But the fact is GER may cause, trigger or exacerbate pulmonary disease like bronchial asthma and many other diseases.

**PROPOSED METHODOLOGY**

A questionnaire can be scientifically accepted by following the standard criteria such as valid, responsive and reliable and it is well determined and established by psychometric methods elsewhere. Such a questionnaire is often administered directly by the patient, filled in, and is straightforward to know as these attributes guarantee prime quality information assessment. The GER symptoms are not always known in the endoscopy test and at the same time the asthmatic patient reported as ‘normal’ is not always having the normal respiration. This is due to the fact that GER has implications over asthma. This leads to conduct a prospective assessment of GER prevalence in a population of asthmatic patients and to find the prediction accuracy of severity of asthma using the proposed classification model called Hybrid Meta Model Classification (HMMC).

**SELECTION OF ALGORITHMS**

Random Forest is the flexible machine learning algorithm and produces accurate result with hyper parameter tuning. This supervised learning algorithm builds multiple decision trees, merges them together to get a more accurate and stable prediction [7]. It can also handle missing values and large dataset with higher dimensionality effectively [8]. Support Vector Machine (SVM) is used in binary classification and also applied for pattern recognition and it is a promising classification approach for prediction purpose [9].

**DATASET DESCRIPTION**

- The GER symptom parameters have been assessed to the above asthmatic patients through the questionnaire form and entered in a spread sheet and stored as .csv file.

The resultant significant GER symptom parameters from my previous research work and the PFT report data are taken under consideration for the purpose of classification.

The dataset comprises of
- PID (Patient ID)
- Age
- Gender
- Heartburn (GER symptom)
- Dysphagia (GER symptom)
- Nausea (GER symptom)
- PFT Report
- FreqCheckup

**Table 1: Possible values of attributes**

<table>
<thead>
<tr>
<th>Heartburn</th>
<th>Dysphagia</th>
<th>Nausea</th>
<th>Report</th>
<th>FreqCheckup</th>
</tr>
</thead>
<tbody>
<tr>
<td>voften</td>
<td>voften</td>
<td>voften</td>
<td>normal</td>
<td>yes</td>
</tr>
<tr>
<td>often</td>
<td>often</td>
<td>often</td>
<td>mild</td>
<td>no</td>
</tr>
<tr>
<td>noften</td>
<td>notAtAll</td>
<td>notAtAll</td>
<td>severe</td>
<td></td>
</tr>
<tr>
<td>notAtAll</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EXPERIMENTAL RESULTS**

**CLASSIFICATION TREE**

The Classification tree has the structure of a flowchart in which each node represents a condition test on an attribute and that each branch indicates the outcome of the condition test. Each terminal or leaf node indicates the class labels. Fig 1 shows the distribution of class labels of the PFT report with GER key attributes.
CLASSIFICATION ALGORITHMS

In random forest algorithm the importance of a variable can be estimated by looking the rate of increase in prediction error when data for that variable is permuted while all the others are left unchanged. The calculations are carried out tree by tree as the random forest is developed [10].

“SVM converges fast and leads to high accuracy. When scores of multiple parameter datasets are combined, majority voting reduces noise and increases recognition accuracy” [11]. It also includes avoidance of over fitting effectively [12]. The built SVM model has the accuracy of 94.85% [Fig 2] and the accuracy of the Random Forest model has the greater accuracy of 95.15% [Fig 3].

BOOSTING ALGORITHMS

C5.0 is the extension of C4.5 algorithm. It gives a binary tree or multi branch tree and uses the gained information for splitting criteria. For estimating missing values it uses other attributes. It represents how the rules are generated with high accuracy and low memory usage [13]. Stochastic Gradient Boosting is one of the powerful classification algorithms that attains maximum accuracy 96.97% whereas the accuracy of C5.0 is 93.64% which is lesser than SGB. SGB is powerful in terms of classifier and prediction at less execution time.
Fig 2: SVM Classification Model

Fig 3: Random Forest Classification Model
PROPOSED MODEL

The hybrid function model can be generated for the predictive purpose with less error and high accuracy without affecting the data consistency \[14\]. Hybrid model reduces the diagnostic procedure to identify the diseases and to mine the hidden pattern of knowledge \[15\]. A Hybrid model is needed to diagnose the complexity of disorders and requires more empirical evidences before incorporated into clinical practise \[16\].

HYBRID META MODEL CLASSIFICATION (HMMC)

Step 1: Splitting the dataset into training and testing data.

Step 2: The developed Random Forest Classification Model and the SVM Classification Model is Combined by the ensemble classification technique called Stacking.

Step 3: Then the stacked outcome is fed into another ensemble classification technique called Boosting.

Step 4: The Boosting concept is implemented by the proposed Improved Gradient Boosting algorithm to get the maximum accuracy in less time.

PERFORMANCE ANALYSIS

Table 2: Classification Accuracy

<table>
<thead>
<tr>
<th>Model Built Using</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVM</td>
<td>94.84%</td>
</tr>
<tr>
<td>Random Forest</td>
<td>95.15%</td>
</tr>
<tr>
<td>HMMC</td>
<td>99.4%</td>
</tr>
</tbody>
</table>

![The classification Accuracy Graph](image)

Fig 4: Classification Accuracy Graph

From the Fig 4 the classification accuracy depicts that the proposed model HMMC has the maximum accuracy rather than the existing classification techniques.

CONCLUSION

From the above implementation it has been interpreted that the results of the proposed ensemble model classification HMMC shows improved overall classification accuracy significantly rather than the existing model classification accuracy. This model confirms that the significant GER symptom parameters have high impact on asthmatic patients. Even though the asthmatic patient’s PFT report says the condition of the patients as normal or mild, the existence of the significant GER symptom parameters makes the patient’s respiration more worst and their by urging them for frequent check-ups.

Ethical Clearance–Not Required (only getting the test report from the hospital).

Source of Funding- Self.

Conflict of Interest – Nil.

REFERENCES


Prevalence of Dysmenorrhea among Female Medical Students and its Impact on their Day to Day Activities

Preetha Paul¹, Arul Sekary², Kannan I³

¹Associate Professor, Department of Physiology, Tagore Medical College and Hospital; ²CRRI, Tagore Medical College and Hospital; ³Associate Professor, Department of Microbiology, Tagore Medical College and Hospital, Rathinamangalam, Chennai

ABSTRACT

Background: Dysmenorrhea refers to painful menstruation with associated symptoms such as backache, headache etc. and is quite common among young women. In many, it hampers normal day to day activities resulting in lost work-hours.

Aim: This study was taken up to estimate the prevalence of dysmenorrhea among female medical students, its impact on sufferers’ daily activities and their knowledge of treatment options.

Materials and Method: This was a cross-sectional study conducted among 150 medical students of ages 18 – 21 in Tagore Medical College, Chennai. All subjects were given a questionnaire with questions pertaining to pain during menstruation, its severity, other associated symptoms, effect on day-to-day activities as well as management options. Using information from the questionnaire, grading of subjects into mild, moderate and severe dysmenorrhea was done.

Results and Discussion: Overall prevalence of dysmenorrhea among the study population was found to be 72.67 % with commonest symptoms associated being headache (88%) and backache (64%). Of the dysmenorrheic population, 42% had mild, 39% had moderate and 19% had severe dysmenorrhea. Low class concentration (59%), class absenteeism (34%), college absenteeism (20%), limitation of social activity (52%) and curtailment of sporting activities (57%) of sufferers were found, all of these being more in the severe dysmenorrhea group. Regarding knowledge of medication, only 12% and 20% knew that paracetamol and mefenamic acid were treatment options. Dysmenorrhea was managed mainly by rest (52%) while 19% used analgesics. The majority considered dysmenorrhea to be a normal female experience and did not think it warranted any treatment.

Conclusion: Painful menstruation is considered to be a normal female experience by young female medicos. They need to be educated on effective management methods and given knowledge of appropriate medications so that dysmenorrhea will no longer be the cause of lost work hours or poor quality of life.

Keywords: dysmenorrhea, class concentration, college absenteeism, medical students, menstruation

INTRODUCTION

In the world of today, where women have made significant strides in education and professional growth, it appears that dysmenorrhea is one burden many of them continue to carry. Dysmenorrhea is quite common among young women. Shaw’s textbook of gynaecology
defines dysmenorrhea as “cramping pain accompanying menstruation”. It is associated with symptoms such as lower abdominal pain, backache, pain in the thighs, nausea/vomiting, fatigue, headache, lightheadedness and even diarrhea. In many young women, dysmenorrhea is so severe that it hampers their normal activities one to two days every month and is a major reason for school and college absenteeism.

Going by the findings of different studies, the prevalence of dysmenorrhea appears to vary greatly between 45 and 95% depending on the population under study and method of data collection. Many women, however, consider dysmenorrhea to be a normal phenomenon and do not feel it merits medical attention. Untreated dysmenorrhea results in lost work hours in schools, colleges and offices. It affects the person’s personal and family life, and has social and economic consequences as well.

This study was taken up to determine the prevalence of dysmenorrhea among female medical students in Tagore Medical College, Chennai, its impact on sufferers’ daily activities and knowledge of treatment options.

**MATERIALS AND METHOD**

The study was done among 150 female first and second year medical students at Tagore Medical College and Hospital, Chennai, Tamil Nadu, using a cross-sectional study design and simple random sampling. Ethical approval was taken from the institutional ethical committee. Healthy unmarried nulliparous female students of age ranging from 18-21 years were included in the study after obtaining written consent from them. Students having polycystic ovarian disease, dysfunctional uterine bleeding, primary amenorrhea, any pelvic pathology, secondary dysmenorrhea or any other gynecological disease were excluded from the study.

**Data collection:**

After obtaining written consent from the participants, the structured and validated study questionnaire was administered. It carried questions on details pertaining to the menstrual cycle, pain during menstruation, its severity and other associated symptoms, effect on day-to-day activities as well as management options.

The severity of menstrual pain was estimated by the visual analogue scale and scoring for severity of dysmenorrhea was done based on information from the questionnaire using the multidimensional scoring system of Andersch and Milsom. This system grades dysmenorrhea into mild, moderate and severe based on the pain score, effect on daily activities and requirement for analgesia. In mild dysmenorrhea, there is mildly painful menstruation, but daily activities are hardly affected and analgesia rarely required. The moderate category has more painful menstruation so that daily activities are curtailed. However, analgesics help to manage the symptoms. In severe dysmenorrhea, the menstrual pain is severe with associated vegetative symptoms, daily activities are clearly affected and analgesics are not effective.

**Statistical analysis:**

Data was entered in Excel sheet and analysis was done using SPSS software. Statistical analysis was performed using appropriate tests such as student t test and chi square. P value of < 0.05 was taken as statistically significant.

**RESULTS AND DISCUSSION**

A total of 150 students took up the questionnaire and all of them completed it. Overall prevalence of dysmenorrhea among the study population was found to be 72.67% (109/150), while 27.3% (41/150) said they experience no menstrual pain.

Cycle characteristics of the dysmenorrheic women are shown in Table 1. Of the 109 dysmenorrheic students, 102 reported normal cycle lengths; 22% reported a longer than normal duration of period; 10% reported using five or more pads per day and an overwhelming 58% reported the passage of clots in menstrual blood.
Table 1: Cycle characteristics in dysmenorrheic women

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Women with dysmenorrhea (n = 109)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at menarche</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;= 11 years</td>
<td>8</td>
<td>7.3</td>
</tr>
<tr>
<td>12 to 14 years</td>
<td>90</td>
<td>82.6</td>
</tr>
<tr>
<td>&gt;14 years</td>
<td>11</td>
<td>10.1</td>
</tr>
<tr>
<td>Cycle length</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 to 35 days</td>
<td>102</td>
<td>93.6</td>
</tr>
<tr>
<td>&gt;35 days</td>
<td>5</td>
<td>4.6</td>
</tr>
<tr>
<td>Don’t know</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>Duration of period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;= 5 days</td>
<td>85</td>
<td>78.0</td>
</tr>
<tr>
<td>&gt;5 days</td>
<td>24</td>
<td>22.0</td>
</tr>
<tr>
<td>Pad usage per day during menstruation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;= 4</td>
<td>98</td>
<td>89.9</td>
</tr>
<tr>
<td>5 to 7</td>
<td>11</td>
<td>10.1</td>
</tr>
<tr>
<td>Presence of clots</td>
<td>Yes</td>
<td>57.8</td>
</tr>
</tbody>
</table>

Table 2 lists associated symptoms present along with their frequency. The commonest symptoms were headache (88%), backache (64%), abdominal cramps (64%) and mood changes (39%). Fatigue occurred in 27.5%. In the study by Singh et al fatigue occurred in 70.9%, backache in 62% and headache in 26.6%. A study done among Thai adolescents showed abdominal cramps at 78 %, backache at 59%, mood changes at 57% and fatigue at 43%.

Table 2: Associated symptoms in dysmenorrheic women

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Women with dysmenorrhea (n = 109)*</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>96</td>
<td>88.1</td>
</tr>
<tr>
<td>Backache</td>
<td>70</td>
<td>64.2</td>
</tr>
<tr>
<td>Abdominal cramps</td>
<td>70</td>
<td>64.2</td>
</tr>
<tr>
<td>Mood Changes</td>
<td>42</td>
<td>38.5</td>
</tr>
<tr>
<td>Fatigue</td>
<td>30</td>
<td>27.5</td>
</tr>
<tr>
<td>Nausea</td>
<td>20</td>
<td>18.3</td>
</tr>
<tr>
<td>Loss of Appetite</td>
<td>19</td>
<td>17.4</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>09</td>
<td>8.3</td>
</tr>
<tr>
<td>Fainting</td>
<td>09</td>
<td>8.3</td>
</tr>
<tr>
<td>Dizziness</td>
<td>07</td>
<td>6.4</td>
</tr>
<tr>
<td>Vomiting</td>
<td>05</td>
<td>4.6</td>
</tr>
</tbody>
</table>

*Most women had more than one symptom

Of the dysmenorrheic population in our study, 42 % (46) had mild dysmenorrhea, while 39 % (42) belonged to the moderate category. Nineteen percent (21) of the students had severe dysmenorrhea (Table 3). The prevalence of dysmenorrhea among 18-21 year old nursing students in Mumbai was reported to be 45% with 18% having mild dysmenorrhea, 40% having moderate and 42% having severe dysmenorrhea while another study done in three medical colleges in India reported 73% prevalence with 63.3% having mild, 30.4% having moderate and 6.3% having severe dysmenorrhea. A study done among adolescents in Rajasthan reported a rural prevalence of 81.5% and an urban prevalence of 76 %. Of the rural category, 52 % had mild, 26.5 % moderate and 3 % had severe dysmenorrhea. Of the urban group, 56.5 % had mild, 12.5 % moderate and 7 % severe. A Gwalior study reported an incidence of 79.6 % dysmenorrhea among adolescents there. Our findings
are comparable with these earlier estimates.

Table 3 shows the impact of dysmenorrhea on the day to day lives of affected young women. We found 59% being affected by low class concentration overall among the dysmenorrheics with 85.7% from the severe category, 78.6% from the moderate and 30.4% from the mild category. These differences were statistically significant (p=0.000). The Thai study found a total of 63.6% of dysmenorrheics suffering from poor class concentration with 51.4% from the mild group, 73.4% from the moderate group and 87.1% from the severe group being affected.

Class absenteeism stood at 90.4% among the severe, 35.7% among the moderate and 6.5% among the mild dysmenorrheics. 76.1% of severe dysmenorrheics and 9.5% of moderate dysmenorrheics had to miss a whole day of classes. These differences also were found to be statistically significant (p=0.000). The Thai study showed 80.6% of the severely dysmenorrheic, 27.7% of the moderate and 11.7% of the mild group missing classes. Singh’s study revealed 31.64% college absenteeism among dysmenorrheics and 8.9% class absenteeism. Our study also found that normal daily activity was curtailed in 53% of the dysmenorrheics with 95.2%, 76.2% and 13% of the severe, moderate and mild categories respectively being affected. Social activity also was limited in 52% of sufferers and sporting activities in 57%. Singh et al found an overall 67.1% of subjects reporting withdrawal from academic, social and sports activites.

Table 3: Impact of dysmenorrhea on students’ daily activities

<table>
<thead>
<tr>
<th>Grade of Dysmenorrhea</th>
<th>Severe n = 21</th>
<th>Moderate n = 42</th>
<th>Mild n = 46</th>
<th>Total n = 109</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low class concentration*</td>
<td>18 (85.7 %)</td>
<td>33 (78.6 %)</td>
<td>14 (30.4 %)</td>
<td>65 (59.6 %)</td>
<td>.000</td>
</tr>
<tr>
<td>Class absenteeism*</td>
<td>19 (90.4 %)</td>
<td>15 (35.7 %)</td>
<td>3 (6.5 %)</td>
<td>37 (33.9 %)</td>
<td>.000</td>
</tr>
<tr>
<td>College absenteeism for the whole day*</td>
<td>16 (76.1 %)</td>
<td>4 (9.5 %)</td>
<td>0 (0 %)</td>
<td>20 (18.3 %)</td>
<td>.000</td>
</tr>
<tr>
<td>Limits normal daily activity*</td>
<td>20 (95.2 %)</td>
<td>32 (76.2 %)</td>
<td>6 (13.0 %)</td>
<td>58 (53.2 %)</td>
<td>.000</td>
</tr>
<tr>
<td>Limits social activity*</td>
<td>14 (66.7 %)</td>
<td>33 (78.6 %)</td>
<td>10 (21.7 %)</td>
<td>57 (52.3 %)</td>
<td>.000</td>
</tr>
<tr>
<td>Limits sport activity</td>
<td>13 (61.9 %)</td>
<td>28 (66.7 %)</td>
<td>21 (45.7 %)</td>
<td>62 (56.9 %)</td>
<td>.121</td>
</tr>
</tbody>
</table>

* statistically significant

For management of dysmenorrhea, resting appears to be the preferred method with 52% opting for the same. 21% did nothing, while 19% used analgesics (Table 4). Other home remedies like heating pads and herbal remedies were used by 7% of the dysmenorrheics. In a study at a university in Ankara, 69% of female students used analgesics, 56.5% used heat application and 71.4% took rest to manage menstrual pain. The Thailand study found 92% of dysmenorrheics opting for rest, 34% using heating pads and 32% using analgesics. Of the dysmenorrheic population in our study, 54% had no knowledge of pharmacologic agents that could be used for pain management in dysmenorrhea (Table 4). Only 12% and 20% knew that paracetamol and mefenamic acid were treatment options. Around 12.8% were aware of naproxen and other NSAIDs. In the Thai study, awareness levels were much higher at 98.8% for paracetamol and 85% for aspirin, though only 6% knew about mefenamic acid. Our population has very low awareness regarding analgesics and their use in dysmenorrhea.
Table 4: Management methods and knowledge regarding pharmacologic agents for dysmenorrhea

<table>
<thead>
<tr>
<th>Management of Dysmenorrhea</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing</td>
<td>23</td>
<td>21.1</td>
</tr>
<tr>
<td>Only Rest</td>
<td>57</td>
<td>52.3</td>
</tr>
<tr>
<td>Rest and Analgesics</td>
<td>21</td>
<td>19.3</td>
</tr>
<tr>
<td>Other Methods</td>
<td>8</td>
<td>7.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge of Drugs</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>59</td>
<td>54.1</td>
</tr>
<tr>
<td>Paracetamol</td>
<td>14</td>
<td>12.8</td>
</tr>
<tr>
<td>Mefenamic Acid</td>
<td>22</td>
<td>20.2</td>
</tr>
<tr>
<td>Others</td>
<td>14</td>
<td>12.8</td>
</tr>
</tbody>
</table>

Surprisingly, 96% of mild, 93% of moderate and 67% of severe dysmenorrheics considered dysmenorrhea to be a normal female experience and did not think it warranted any treatment (Table 5). Only 4%, 7% and 33% of mild, moderate and severe dysmenorrheics respectively felt that they need not suffer, but could seek medical help to alleviate their pain. These findings were comparable with those of the Thai study. This shows that an overwhelming majority of young women look on dysmenorrhea as normal and only a very small percentage opt for treatment.

Table 5: Attitude towards dysmenorrhea

<table>
<thead>
<tr>
<th>Grade of Dysmenorrhea</th>
<th>Severe (n = 21)</th>
<th>Moderate (n = 42)</th>
<th>Mild (n = 46)</th>
<th>Chi Square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal female experience</td>
<td>14 (66.7%)</td>
<td>39 (92.9%)</td>
<td>44 (95.7%)</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>I need not suffer</td>
<td>7 (33.3%)</td>
<td>3 (7.1%)</td>
<td>2 (4.3%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Appropriate health education will go a long way in letting young women know that dysmenorrhea is not a normal female experience and needs to be evaluated and treated. Getting dysmenorrhea treated assumes more importance in the light of recent research findings suggesting that it might predispose sufferers to other chronic pain conditions as they grow older.12

CONCLUSION AND IMPLICATIONS

This study serves to estimate the prevalence and severity of dysmenorrhea in young medical students and assess its impact on their daily activities.

Going by the findings of our study, painful menstruation appears to be a burden carried by a majority of young female medicos. Our finding of 19% students having severe dysmenorrhea shows the extreme suffering that many of them experience on a regular basis. They need to be educated that this is not necessarily a normal female experience, but needs to be managed effectively by using appropriate medication. Knowledge of these medications also needs to be given them as well as the assurance that these are not addictive as fear of addiction seems to deter many from using analgesics. The possible role of dysmenorrhea in predisposing individuals to other
chronic pain conditions also needs to be highlighted.

Creating awareness and giving health education regarding symptom management could help students manage the pain better and minimize the work-hours lost due to dysmenorrhea.

It will be beneficial if this study could be done in other population groups and also in the general community. It will give an idea of the public health burden of dysmenorrhea and its impact on the lives of young women both in the personal and socio-economic domains, so that appropriate remedial measures could be promoted to help them have a better quality of life.

Ethical Clearance: Taken from the Institutional Ethics Committee, Tagore Medical College and Hospital

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


Factors Enhancing Academic Performance in Management Courses among Post Graduate Pupils’ of a Management Institution

M. Sankar¹, Sudha²

¹PhD Research Scholar, School of Management Studies Vels Institute of Science Technology and Advanced Studies,  
²Associate Professor and Research Supervisor School of Management Studies, Vels Institute of Science Technology and Advanced Studies

ABSTRACT

Purpose - The idea of the research is to look at the role of factors enhancing learners’ presentation. The factors influence on academic performance such as teaching styles, communication method, assessment methods and ICT skills are considered. The Dependant variable academic performance is considered as univariate.

Research methodology- Purposive Sampling was used in the study to collect the data; structured Questionnaire was distributed to 110 respondents of students (male and female). 10 Questionnaires were found to be unfilled so total 100 respondents (n=100). CFA and SEM were the statistical tools applied for the analysis in AMOS-21 to check the hypothesis of learn.

Findings - This analysis shows a positive and significant relationship between the independent variables teaching styles and ICT skills and the dependent variable Academic performance.

The variable ICT Skills is a new variable used in review of literature in India. But it has started to gain momentum in all aspects. The study also reveals the significance of ICT usage through the study among management students.

Practical implication – The paper have definite confines. The study was pertaining to management students only. On the other hand the implications are the results of the study can be used for the purpose of developing new strategies in the field of academics in the management students. For researchers this study can be extended for future variables with more related variables. Secondly it can spread across to other educational institutions also.

Uniqueness – This study is an initial try to know, ‘enhance of variables relating to academic performance of Post graduate Students in Indian context.

Keywords – Teaching, pedagogy, academic performance, communication.

INTRODUCTION

Many countries have different approaches towards teaching and learning. Research studies have been carried out to investigate the best ways of teaching. One such facet of teaching in teachers’ personal qualities are directly related to the subject matter of teaching. Hence
choice of the method and teachers’ through the substance of the issue becomes important under learning context. There is a collaborative interaction among individual traits, the process by teacher utilize to communicate the substance of subject matter, and the method’s display as learner

The Methods through the teacher was teaching as exacting instance of requirements, idea, and behaviors that instructor exhibit in study hall. This study was used in conceptual framework. the teaching method’s as explain by Teacher through the Methods styles handling in class and study environment. In 20th century different learning methods were followed. Special pedagogy was change in modern trend, since the pupils call for to learning process. What?, When?, How? To instruct lessons? The authority method is related to lectures styles or teachers’ styles. Demonstrated method means coaching styles. The facilitator style means action method. The delegator style means peer feedback

Theoretical Model

A model framework recommended by Lebeir model was taken as a base model for the study. They are teaching styles, ICT-skills and academic performance. The researcher has tested this frame work in the form of questionnaire, distributed to the students of management studies in a University - education institution.

Figure 1. Theoretical Model

Statement of the problem

Many researchers analyzed student’s presentation (performance) by Grade point average (GPA) and cumulative grade point average (CGPA) was found. In this articles followed by Grade point value. Some researcher to examining the quarterly, half yearly and annually to collect the pupil progress in required research. The aim of the present study was concentrate pupil’s learning and outcome of the performance (exam results) was calculated by GPA. The pupil attitude, skills, interest on listening skill and extra activities (NSS, sports and NCC and yoga) Private institution vision is to be a hub of quality in the midpoint of Tamil Nadu. Though the academic deans and the excellence and declaration of commission have noted that while some Pupils do highly and other do not complete healthy. Describe the pupil to check the progress in calendar year. Every calendar year to check institute quality and student enrolment, mark sheet and degree awarded, maintained by university Grants commission (UGC).

Teaching styles:

Teaching method is a fundamental brick in teaching pedagogy, which has exposed to special details given by many research persons. Other research studies also highlight about teaching performance and the similarity between the instructing style and his or her thinking of the professor. Furthermore, instructing style was specific and related with the different special sets of classroom instructing style’ as explained. Talk about the study submits to the person’s enveloping instructional traits that continue to change the learning process’. On the other hand, the normal attribute get beginning these previous studies are the coaching behavior and wisdom.
course of action.

**ICT-Skills**

The world of internet has shown tremendous growth and improvement over the past two decades\(^1\). The article focuses on the relativity and influence of ICT skills on academic performance of the students. A few previous studies on integration and usage of these skills in academic performance by students were found\(^2\). Hence this becomes one of the major research gaps of the present study. Study by Angeles highlights on usage of ICT skills has a major advantage\(^3\). According to the survey taken and highlights on the differences in the attitude in the usage of ICT skills in academic performance between boys and girls. ICT skills are fundamental for student and teacher inter related\(^4\).

**Academic performance:**

There is a dearth in review of literature based on academic performance. Studies done on linguistic students’ highlights the importance of academic performance among students. He has shown educative uses of ICT and its usage in academic performance and the results reveal there is a positive relationship between two variables\(^5\).

**Research question:**

1. Does teaching styles and ICT impacts academic performance of students?

**Objective of the study:**

1. To analyze the association among teaching styles, ICT and academic performance.

**Hypotheses of the study**

H1. There is significant relationship between teaching styles, ICT and academic performance.

**Materials and Methods**

The research was carried out the association between teaching styles, ICT skills and academic performance measured among 110 post graduate students. The researcher administered a survey through questionnaire to discover the number of students learning skills and ICT skills in academic performance.

**Sampling procedure**

The respondents of this study consist of Management students’ at the private university. Purposive sampling was used for the research study. The total number of students (male and female) of the management students’ structured Questionnaire was distributed to 110 respondents of students (male and female). 10 Questionnaires was found to be unfilled so total 100 respondent filled quality questionnaire.

**Data Analysis**

**Table I. Overall Reliability of the Data**

<table>
<thead>
<tr>
<th>Alpha((\alpha)) std. things</th>
<th>Number of things</th>
</tr>
</thead>
<tbody>
<tr>
<td>.877</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cronbbach’s Alpha</th>
<th>No of Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic performance</td>
<td>.799</td>
<td>5</td>
</tr>
<tr>
<td>Teaching styles</td>
<td>.658</td>
<td>4</td>
</tr>
<tr>
<td>ICT-skills</td>
<td>.794</td>
<td>5</td>
</tr>
</tbody>
</table>

Overall reliability instrument study was 0.877.

The present paper to analyze reliability of the total Item is 0.875 is significant individual alpha (Teaching styles) is 0.70 and ICT-skills is 0.794 and dependent variable academic performance is 0.799 the on the whole 0.875. It is value note that 0.70 should be an good enough alpha value and coefficient still lower coefficients used in a few research. Explain above the table.

**Table II. (KMO test)**

<table>
<thead>
<tr>
<th>KMO test.</th>
<th>Chi-Square(approx)</th>
<th>The (Bartlett’s Test ) Degrees of freedom(DF) Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>.836</td>
<td>534.590</td>
<td>91 .000</td>
</tr>
</tbody>
</table>

The value received through KMO test was .836 which is above the threshold of .7. The Chi-square value was 534.590 and the significant p value is .000. Hence the sample taken for the study is adequate in nature.
CONCLUSION

This study was carried to explain the role of teaching styles and ICT skills. Both the variables do play a vital role in the academic performance. ICT usage has been one of the weak areas in the field of Indian education, but it has started to gain momentum. Future studies with more mediation variables like gender and GPA can be used.

Conflict of Interest: Nil

Ethical Clearance: NA

Source of Funding: Self

REFERENCES


Antibiotic Susceptibility Pattern of *Staphylococcus aureus* and Methicillin – Resistant *Staphylococcus aureus* Isolated from Various Clinical Specimens in a Tertiary Care Teaching Hospital, Pondicherry

P.Vamsi Muni Krishna1, V. Sreenivasulu Reddy2, V. Praveen Kumar3, P. Suresh1

1Ph.d Scholar, Bharath University, Agaram Road, Selaiyur, Chennai, Tamilnadu,  
2Professor, Dept. of Microbiology, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry,  
3Ph.d Scholar, Bharath University, Agaram Road, Selaiyur, Chennai, Tamilnadu

**ABSTRACT**

**Introduction:** *Staphylococcus aureus* is one of the most common human pathogen capable of causing a wide range of infections. *Staphylococcus aureus* is a common cause of both community and hospital infections. It was the endemic microorganism in several reports of nosocomial infections which induced high mortality and morbidity. This microorganism is a virulent bacterium that can cause serious infections including skin and soft tissue infections, wound infection, bacteremia, pneumonia and endocarditis. It is estimated that *Staphylococcus aureus* has developed the ability to acquire resistance to all classes of antimicrobial agents and methicillin-resistant *S. aureus* (MRSA) has become a major problem in many hospitals worldwide. Hospital acquired infection (HAI) due to multidrug resistant bacteria like MRSA are a growing problem in many health care institutes. **Materials and Method:** A total of 568 clinical isolates of *Staphylococcus aureus* were isolated from various clinical specimens received in the Department of Microbiology, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry from April 2014 to December 2017, were included in the study. Isolation and identification of *Staphylococcus aureus* was done by standard conventional microbiological methods. Identification of MRSA was done as per standard guidelines of CLSI by using Oxacillin broth microdilution method. Antibiogram was determined by Kirby-Bauer disc diffusion method on Mueller-Hinton agar with zones of inhibition. **Results:** *Staphylococcus aureus* was susceptible to Vancomycin (94.7%), followed by Teicoplanin (91.7%), Linezolid (88.5%), Amikacin (85.7%). In case of MRSA all the isolates showed 100% susceptibility to vancomycin, followed by Teicoplanin (97.5%), Amikacin (84.7%) linezolid (80.3%) and Clindamycin (54.8%). In case of MRSA all the isolates were 100% susceptible to vancomycin followed by teicoplanin (97.5%), amikacin (84.7%) linezolid (80.3%) and clindamycin (54.8%).

**Conclusion:** MRSA infections are emerging as a serious health problem in health care set up. Joint efforts by clinicians, clinical microbiologists, hospital management and public health authorities are required to meet the challenge of MRSA on the forefront.

**Keywords:** *Staphylococcus aureus*, MRSA, Oxacillin, Vancomycin.

**INTRODUCTION**

*Staphylococcus aureus* has been renowned as an important cause of human disease for more than 100 years. Alexander Ogston had first isolated *Staphylococcus aureus* from a surgical abscess in 1880 and described the role of *Staphylococcus aureus* in localized infection and septicemia, including the use of animal models for infection.

*Staphylococcus aureus* has emerged as one of the main important human pathogens, and has over...
the past decades, been a leading cause of hospital and community-acquired infections. Staphylococcal infections give rise to a wide spectrum of symptoms and diseases in humans. The bacterium is well characterized and known to have a diverse arsenal of virulence factors that causes a prominent inflammatory response. This pathogen affects both immune competent and immuno compromised individuals, frequently resulting in high morbidity and with complications, which constitute problem to health care institutions. S. aureus has been reported by several studies as the causative agent of wide variety of diseases of supportive infections such as boil, wound infection, pustule, subcutaneous and sub-mucosa abscesses, osteomyelitis, mastitis, impetigo, septicemia, meningitis, bronchopneumonia, food poisoning, a common cause of vomiting, diarrhea, and urinary tract infections.

S. aureus was discovered in 1880, its effective treatment was started in 1940 penicillin was the only drug used for treatment of the infections caused by this bacterium. After in late 1940 and throughout 1950 S. aureus developed resistance mechanism to penicillin. Introduction of Methicillin was done in 1961 to treat these resistant strains and within a year or later, clinicians had encountered methicillin - resistant Staphylococcus aureus which became a big threat. Now strains of MRSA are simultaneously resistant to a list of different groups of antibiotics, including vancomycin which is often considered our last line of antibacterial defence. Methicillin-resistant Staphylococcus aureus (MRSA) has been recognized as one of the major pathogens in both hospitaland community settings.

In 1961, British scientists discovered MRSA, the first case of this “superbug” in the United States occurred in 1968. MRSA is due to the acquisition of mecA gene that carried on a large mobile genetic element, the staphylococcal cassette chromosome, and which encodes a low affinity penicillin-binding protein 2a (PBP2a) to β-lactam antibiotics. The mecC gene when present, may also mediate methicillin resistance. The mecA complex also contains insertion sites for plasmids and transposons that facilitate acquisition of resistance to other antibiotics. Hospital acquired MRSA is frequently multidrug resistant. This limits the therapeutic options to a few antimicrobials, which are toxic, complicated to administer and expensive. As a consequence patients have to be hospitalized for a longer duration, treatment costs are increased and associated mortality also rises.

This has a significant impact on individual patients and institutions. An additional concern of grave significance is the emergence of vancomycin intermediate Staphylococcus aureus (VISA) and more recently vancomycin resistant Staphylococcus aureus (VRSA). Hence this study was conducted to evaluate Antibiotic susceptibility pattern of Staphylococcus aureus and to determine methicillin- resistant Staphylococcus aureus (MRSA) isolates from various clinical specimens.

**MATERIALS AND METHOD**

A total of 568 consecutive, clinically significant, non-repetitive clinical isolates of Staphylococcus aureus were isolated from various clinical specimens (pus, urine, wound swabs, sputum, ear swabs, body fluids, throat swabs, catheter tip, nasal swabs, blood) received in the Department of Microbiology, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry, during the period of April 2014 to December 2017 were included in this study.

**Specimen collection:**

The specimens were collected in sterile containers following aseptic measures and transported to the laboratory without delay and processed immediately. All the specimens were inoculated on 5% sheep blood agar and Mac Conkey’s agar and plates were incubated aerobically at 37°C.

**Identification of Staphylococcus aureus:**

Colony morphology, Gram reaction, pigment production, catalase, and mannitol fermentation tests were performed and allocated to appropriate genera to the isolates. Golden yellow colored colonies on nutrient agar were noted and slide coagulase and tube coagulase was performed for differentiation of S. aureus.

**Identification of Methicillin-resistant Staphylococcus aureus by Cefoxitin disk diffusion method:**

The MRSA strains were identified by using Cefoxitin (30μg) disc on Muller Hinton agar (Hi-Media Laboratories, Mumbai). Zone size was interpreted according to CLSI criteria, susceptible, >22 mm; resistant, ≤21 mm.

**Identification of MRSA by Oxacillin broth dilution method:**
MICs of oxacillin for all isolates showing reduced zone of inhibition by cefoxitin disk diffusion were determined by broth microdilution method as described by Raghabendra Adhikari et al\textsuperscript{13} and CLSI guidelines\textsuperscript{14}. The concentrations of oxacillin used were 0.0125 μg/mL to 128 μg/mL.

**Antibiotic susceptibility.**

Antibiotic sensitivity was tested using the Kirby-Bauer disc diffusion method (1966) on Mueller-Hinton agar according to antibiotic Clinical and Laboratory Standards Institute disc susceptibility testing guidelines (2013).\textsuperscript{14} Bacterial suspension equivalent to 0.5 McFarland was prepared by mixing 3-5 well isolated colonies in 3-4 ml of sterile physiological saline. Each suspension was inoculated on Muller Hinton agar (Hi-Media Laboratories, Mumbai) using sterile cotton swab and antibiotic disks were applied and incubated aerobically at 37°C. Antiobriogram was determined for the following antibiotics Teicoplanin (30μg), Vancomycin (30μg), Gentamicin (50μg), Amikacin (30μg), Linezolid (30μg), Ciprofloxacin (10μg), Cefotaxime (30μg), Clindamycin (2μg), Co-trimaxazole (25μg), Erythromycin (15μg), Penicillin (10units), Tetracycline (30μg) (Hi-Media Laboratories, Mumbai).

**RESULTS**

Out of 568 clinical isolates, 321 (56.5%) patients were from male and 247 (43.4%) were female. Majority of the patients were of age 41-50 (17.2%) as shown in (Table- 1 and Table- 2). Distributions of various clinical specimens were given in the (Table- 3).

Of the 568 *Staphylococcus aureus* recovered, 366(64.4%) exhibited resistance by Cefoxitin disk diffusion method and 361(63.5%) were found to be MRSA by broth microdilution method and the cutoff value is 4μg/ml. Among them 127 had high level resistance with MIC of >128μg/ml. The MIC of Oxacillin for *S. aureus* isolates ranged from 0.064 μg/ml to 256 μg/ml.

*Staphylococcus aureus* was susceptible to vancomycin (94.7%), followed by teicoplanin (91.7%), linezolid (88.5%), amikacin (85.7%).

In case of MRSA all the isolates were 100% susceptible to vancomycin followed by teicoplanin (97.5%), amikacin (84.7%) linezolid (80.3%) and clindamycin (54.8%).

**Table- 1: Distribution of *Staphylococcus aureus* according to the Age (n=568).**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No.of isolates</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age( in years):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 -10</td>
<td>37</td>
<td>6.5%</td>
</tr>
<tr>
<td>11-20</td>
<td>69</td>
<td>12.1%</td>
</tr>
<tr>
<td>21-30</td>
<td>81</td>
<td>14.2%</td>
</tr>
<tr>
<td>31-40</td>
<td>98</td>
<td>15.3%</td>
</tr>
<tr>
<td>41-50</td>
<td>102</td>
<td>17.2%</td>
</tr>
<tr>
<td>51-60</td>
<td>87</td>
<td>15.3%</td>
</tr>
<tr>
<td>61-70</td>
<td>72</td>
<td>12.6%</td>
</tr>
<tr>
<td>71-80</td>
<td>19</td>
<td>3.3%</td>
</tr>
<tr>
<td>81-90</td>
<td>3</td>
<td>0.52%</td>
</tr>
</tbody>
</table>

**Table-2: Gender wise distribution of specimens: (n=568).**

<table>
<thead>
<tr>
<th>Gender</th>
<th>No. of isolates</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>321</td>
<td>56.5%</td>
</tr>
<tr>
<td>Female</td>
<td>247</td>
<td>43.4%</td>
</tr>
</tbody>
</table>
Table 3: Distribution of *Staphylococcus aureus* and methicillin-resistant *Staphylococcus aureus* (MRSA) from various clinical specimens:

<table>
<thead>
<tr>
<th>Clinical specimens</th>
<th>No. of <em>S. aureus</em> (n=568)</th>
<th>No. of MRSA (n=361)</th>
<th>Percentage of MRSA (63.5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sputum</td>
<td>174</td>
<td>113</td>
<td>64.9%</td>
</tr>
<tr>
<td>Urine</td>
<td>56</td>
<td>39</td>
<td>69.6%</td>
</tr>
<tr>
<td>Body fluids</td>
<td>19</td>
<td>11</td>
<td>57.8%</td>
</tr>
<tr>
<td>Wound swabs</td>
<td>150</td>
<td>92</td>
<td>61.3%</td>
</tr>
<tr>
<td>Nasal swabs</td>
<td>9</td>
<td>4</td>
<td>44.4%</td>
</tr>
<tr>
<td>Throat swabs</td>
<td>7</td>
<td>4</td>
<td>57.1%</td>
</tr>
<tr>
<td>Catheter tip</td>
<td>13</td>
<td>6</td>
<td>46.1%</td>
</tr>
<tr>
<td>Pus</td>
<td>94</td>
<td>68</td>
<td>72.3%</td>
</tr>
<tr>
<td>Ear swabs</td>
<td>5</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Blood</td>
<td>41</td>
<td>21</td>
<td>51.2%</td>
</tr>
</tbody>
</table>

Table 4: Antibiotic susceptibility pattern of *Staphylococcus aureus* and Methicillin-resistant *Staphylococcus aureus*.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th><em>Staphylococcus aureus</em> (n=568)</th>
<th>MRSA by Oxacillin broth microdilution. (n=361)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Susceptibility Percentage%</td>
<td>Susceptibility Percentage%</td>
</tr>
<tr>
<td>Vancomycin (30µg)</td>
<td>538</td>
<td>94.7%</td>
</tr>
<tr>
<td>Teicoplanin (30µg)</td>
<td>521</td>
<td>91.7%</td>
</tr>
<tr>
<td>Gentamycin (50µg)</td>
<td>421</td>
<td>74.1%</td>
</tr>
<tr>
<td>Amikacin (30µg)</td>
<td>487</td>
<td>85.7%</td>
</tr>
<tr>
<td>Linezolid (30µg)</td>
<td>503</td>
<td>88.5%</td>
</tr>
<tr>
<td>Ciprofloxacin (10µg)</td>
<td>326</td>
<td>57.3%</td>
</tr>
<tr>
<td>Cefotaxime (30µg)</td>
<td>321</td>
<td>56.5%</td>
</tr>
<tr>
<td>Clindamycin (2µg)</td>
<td>259</td>
<td>45.5%</td>
</tr>
<tr>
<td>Co-trimazazole (25µg)</td>
<td>301</td>
<td>52.9%</td>
</tr>
<tr>
<td>Erythromycin (15µg)</td>
<td>261</td>
<td>45.9%</td>
</tr>
<tr>
<td>Penicillin (10 units)</td>
<td>162</td>
<td>28.5%</td>
</tr>
<tr>
<td>Tetracycline (30µg)</td>
<td>173</td>
<td>30.4%</td>
</tr>
</tbody>
</table>

**DISCUSSION**

*Staphylococcus aureus* is one of the most infectious agents with high prevalence in various communities and healthcare institutions. MRSA is recognized as a major cause of nosocomial infections which result in significant morbidity and mortality rates. It is a very common cause of infection in hospitals and is most liable to infect new born babies, surgical patients, old and malnourished persons and patients with diabetes and other chronic diseases. The important reservoirs of MRSA in hospitals are infected or colonised patients and transient carriage and hands of health care workers is the predominant mode for patient to patient transmission.¹⁵
In our study prevalence of MRSA was found to be (63.5% ), similarly such percentages have previously reported in studies from verma et al (80.89%),16 Suresh Jaiswal et al (72%),17 Dr.S.Kulkarni et al (70.3%),18 Tiwari et al (69.1%).19 Joshi.S et al20 and Ali et al (68%),20 Yadav et al (66.84%),21 Shilp Arora et al (59.3%),24 Chandrasekhar et al (56.7%),23 Anupurba et al (54.8%),22 Rijal.K et al (51.6%).2

MRSA strains were predominantly isolated from pus samples (72.3%) which correlates with Yadav et al (86% ),21 Dr.S.Kulakarni et al (64.67%),18 Bandaru S Rao et al (64.38%),23 in contrast Ankur kumar et al27 and Bilal Ahmed Mir et al28 reported (21.42%) and (27.5%).

*Staphylococcus aureus* was susceptible to Vancomycin (94.7%), followed by Teicoplanin (91.7%), Linezolid (88.5%), Amikacin (85.7%). All the MRSA isolates were 100% sensitive to Vancomycin in the present study. The sensitivity followed by Teicoplanin (97.5%), Amikacin (84.7%), Linezolid (80.3%) and Clindamycin (54.8%) correlates with Bhatt CP et al29, Gitau et al30, Ankur Kumar et al.27 and Bandaru S Rao et al.26

**CONCLUSION**

MRSA is emerging as a potential threat to our hospitals with a predilection for critically ill patients. Regular surveillance of hospital acquired infections, promotion of infection control precautions and formulation of definite antibiotic policy can be helpful in preventing MRSA infections from acquiring an alarming proportion. Good basic hygiene measures are extremely important, not only for hospital staff but also for patients and visitors, and it has a positive impact in infection control.

**Ethical Clearance:** Taken from Sri Lakshminarayana Institute of Medical Sciences, Pondicherry. Institutional Ethicscommittee (HumanStudies) Ref.No.IEC/C-P/50/2014.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**

13. Adhikari R, et al. Detection of Methicillin Resistant *Staphylococcus aureus* and Determination of Minimum Inhibitory Concentration of Vancomycin for *Staphylococcus aureus* Isolated from Pus/Wound Swab Samples of the Patients

14. Clinical and Laboratory Standards Institute, Performance Standards for Antimicrobial Susceptibility testing; 22 nd information supplement, M100-S22 Wayne, PA; 2013.


17. Jaiswal, S. et al., A Study of Methicillin Resistant Pattern on Clinical Isolates of Staphylococcus aureus in Tertiary Care Hospitals of Pokhara. BMR Microbiology, 2016; 2(1);1-8


Effect of Retrowalking, a Non-Pharmacological Treatment on Pain, Disability, Balance and Gait in Knee Osteoarthritis: A Randomized Controlled Trial

Shabnam Joshi1, Shailendra Kumar Singh2, Jaspreet Singh Vij3
1Assistant Professor, Department of Physiotherapy, GJUS&T, Hisar, Haryana, India, 2Professor, Department of Pharmaceutical Sciences, GJUS&T, Hisar, Haryana, India, 3Associate Professor, University College of Physiotherapy, Baba Farid University of Health Sciences, Faridkot, Punjab, India

ABSTRACT

Knee osteoarthritis is a common condition in various orthopedic clinics and hospitals. Degenerative changes occur in the cartilage covering the articular surfaces of the joints leading to pain, crepitus, stiffness, limitation of movement and deformity. The purpose of the study was to examine the effect of treadmill retrowalking in patients suffering from knee osteoarthritis. Patients with age more than 40 years diagnosed with knee osteoarthritis by an orthopedician referred to or visiting the O.P.D, Department of Physiotherapy, Guru Jambheshwar University of Science & Technology, Hisar were assessed. Forty two eligible patients were randomly allocated to conventional group and retrowalking group. The conventional group received range of motion exercises, strengthening exercises, stretching and flexibility exercises. The patients in the retrowalking group underwent treadmill retrowalking in addition to conventional exercises. Both the interventions were given thrice weekly for six weeks. The data analysis was done using SPSS 16.0. Independent and dependent t-test was used to compare between and within group differences. Comparison of mean scores of conventional and retrowalking group showed statistically significant differences for all the variables. The study concludes that retrowalking when given along conventional exercise program alleviates pain, decreases disability, enhances balance and gait performance by improving step and stride length, increases cadence and walking speed in knee osteoarthritis patients.

Keywords – retrowalking, knee osteoarthritis, conventional exercises, pain, disability, balance, gait.

INTRODUCTION

Knee osteoarthritis (OA) is a progressive disease commonly encountered in the out-patient departments (O.P.D) of various orthopedic clinics and hospitals. The increasing prevalence of knee OA worldwide is suggestive of a physically crippled society [1]. Degenerative changes occur in the cartilage covering the articular surfaces of the joints leading to pain, crepitus, stiffness, limitation of movement and deformity which adds to the increase in knee replacements [2]. The prevalence of knee osteoarthritis in India is 28.7% [3].

Patients with knee osteoarthritis modify their gait in response to pain. Such patients walk with shorter step and stride length, low cadence and have slower walking speed. These changes, which are possible unloading mechanisms, begin in early stages of medial knee osteoarthritis as identified by computerized gait analysis using spatiotemporal parameters [4-6].

Exercises are commonly employed in the management of knee osteoarthritis as they alleviate pain and physical disability in osteoarthritis patients without adverse effects produced by drugs and surgical procedures [7, 8].

Corresponding author:
Shabnam Joshi
Assistant Professor, Department of Physiotherapy
Guru Jambheshwar University of Science & Technology, Hisar-125001, Haryana, India.
Mobile no- 9729922466
E-mail: shabnamphysio@gmail.com
Retrowalking or backward walking is used nowadays in the management of many orthopedic, neurological and sports conditions [9-12]. It changes muscle activation pattern, lowers knee joint compressive forces and improves strength of quadriceps muscle. The effects of retrowalking on pain, physical disability, quadriceps strength and balance in knee osteoarthritis have been studied [13-17]. However, none of the studies have investigated the effectiveness of a retrowalking program on spatiotemporal gait parameters in knee osteoarthritis patients. The present study aims to know the effect of retrowalking in combination with a conventional exercise program on pain, disability, balance, step length, stride length, cadence and walking speed in patients suffering from knee osteoarthritis.

MATERIAL AND METHOD

Settings and Study participants

Patients with age more than 40 years diagnosed with knee osteoarthritis by an orthopedician who were referred to or attended the O.P.D, Department of Physiotherapy, Guru Jambheshwar University of Science &Technology, Hisar were assessed. Patients having a history of any inflammatory, infectious, traumatic condition of the knee joint, with any previous surgery or any invasive procedure of knee joint, history of cardiac disease, lower limb injury or pathology, fixed deformity of knee, any skin problems around the knee joint, lacking independent ambulation or requiring use of any walking aid, neurological disorders, patients with severe knee osteoarthritis (grade 4 or those referred for knee replacement surgery) and those unable to comply with study protocol were excluded from the study.

In case of bilateral osteoarthritis, more symptomatic knee joint was considered for the study. Forty two patients fulfilling the eligibility were included in the study. The patients were explained the procedure of the study and gave their written consent.

Intervention groups

The patients were then randomly divided into two groups i.e. conventional exercise group and retrowalking group by computer generated random number tables. The Conventional group received conventional exercise program which consisted of hot packs for 10 minutes followed by exercises [18]. These consisted of range of motion exercises, muscle stretching exercises in form of isometric and isotonic exercises, muscle stretching exercises and flexibility exercises. The patients in the Retrowalking group followed retrowalking protocol on a treadmill in addition to the conventional exercise program [14]. Prior to the treatment, every patient was made familiar with retrowalking on the treadmill. The intervention began with a session of 3-5 minutes forward walking on the treadmill for warm up followed by 10 minutes of retrowalking on the treadmill at a comfortable speed at 0° inclination under the supervision of the therapist. The treadmill was placed within a specially designed metal framework with handrails support for safety purposes. Patients were instructed to report any problem faced during retrowalking. Both interventions were given for three sessions in a week for a total duration of six weeks.

Outcome measures

Pre and post intervention testing was done for all outcomes measures for both groups at two time points i.e. at 0 weeks and after 6 weeks of intervention. Visual Analogue Scale (VAS) was used to measure pain intensity [19], Western Ontario and McMaster Osteoarthritis Index (WOMAC) was used for disability [20] and Timed up and Go Test (TUG) was used to assess balance [21]. The measurement of spatio-temporal gait parameters like step length and stride length was done using foot print method [22]. A ten meter walkway was used for step and stride length measurements. The measurements were taken using a measuring tape. The step length was measured as the distance (in cm) between the heels of two consecutive steps of both feet while the stride length was measured as the distance (in cm) between the heels of two successive steps of the same foot. The walking speed (m/s) was measured as the total distance (10 m) of the walkway divided by the time taken to cover the distance. Cadence was evaluated by counting the number of steps per minute during which the patient was made to walk in a corridor at a normal speed.

STATISTICAL ANALYSIS AND RESULTS

The data was analyzed using SPSS 16.0. Dependent t-test was used for comparing between group differences for all variables such as pain, disability, balance, step length, stride length, cadence and walking speed between conventional group and retrowalking group (Table 2) while Independent-t test was used to compare between group differences (Table 3). The level of significance
was set at \( p < 0.05 \). All the values are presented in mean and standard deviation. The mean age, height and weight of study patients was \( 52.5 \pm 8.75 \) years, \( 161.15 \pm 9.45 \) cm and \( 73.69 \pm 6.5 \) kg respectively (Table 1). The conventional group consisted of 8 males and 13 females. The retrowalking group included 12 males and 9 females. Pre and post comparison of study variables show significant improvement in both groups after intervention (Table 2). Comparison of mean scores of conventional and retro-walking group show statistically significant differences for all the variables thus showing better results in case of retrowalking group (Table 3).

### Table 1. Basic demographic data of patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Conventional Group (n= 21)</th>
<th>Retrowalking Group (n=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>54.3(\pm)10.2</td>
<td>50.7(\pm)7.3</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>159.6(\pm)8.9</td>
<td>162.7(\pm)10.0</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>71.5(\pm)8.9</td>
<td>75.7(\pm)10.4</td>
</tr>
<tr>
<td>BMI (Kg/m(^2))</td>
<td>28.1(\pm)8.9</td>
<td>28.6(\pm)10.2</td>
</tr>
<tr>
<td>Sex(M/F)</td>
<td>8/13</td>
<td>12/9</td>
</tr>
</tbody>
</table>

### Table 2. Comparison of study variables at pre and post intervention for conventional and retrowalking group.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group</th>
<th>0 week (pre)</th>
<th>6 week (post)</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain (VAS)</td>
<td>Conventional</td>
<td>7.92(\pm)0.98</td>
<td>5.20(\pm)1.17</td>
<td>13.866</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td></td>
<td>Retrowalking</td>
<td>7.82(\pm)1.08</td>
<td>2.85(\pm)0.88</td>
<td>30.040</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td>Physical disability (WOMAC)</td>
<td>Conventional</td>
<td>51.69(\pm)7.32</td>
<td>31.79(\pm)6.10</td>
<td>26.599</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td></td>
<td>Retrowalking</td>
<td>46.84(\pm)6.44</td>
<td>20.79(\pm)4.20</td>
<td>20.934</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td>Balance (TUG)</td>
<td>Conventional</td>
<td>10.78(\pm)0.72</td>
<td>10.36(\pm)0.79</td>
<td>8.800</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td></td>
<td>Retrowalking</td>
<td>10.24(\pm)1.36</td>
<td>9.22(\pm)1.06</td>
<td>6.353</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td>Step Length (cm)</td>
<td>Conventional</td>
<td>54.86(\pm)5.71</td>
<td>55.09(\pm)5.96</td>
<td>-2.500</td>
<td>(\leq)0.05</td>
</tr>
<tr>
<td></td>
<td>Retrowalking</td>
<td>55.52(\pm)4.38</td>
<td>56.90(\pm)4.59</td>
<td>-7.319</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td>Stride length (cm)</td>
<td>Conventional</td>
<td>105.52(\pm)11.9</td>
<td>105.9(\pm)12.1</td>
<td>-2.961</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td></td>
<td>Retrowalking</td>
<td>107.9(\pm)8.23</td>
<td>110.4(\pm)8.64</td>
<td>-8.971</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td>Cadence (steps/min)</td>
<td>Conventional</td>
<td>101.10(\pm)4.41</td>
<td>103.0(\pm)4.32</td>
<td>-7.684</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td></td>
<td>Retrowalking</td>
<td>102.8(\pm)5.14</td>
<td>107.4(\pm)4.93</td>
<td>-17.593</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td>Walking Speed (m/s)</td>
<td>Conventional</td>
<td>0.87(\pm)0.10</td>
<td>0.96(\pm)0.09</td>
<td>-4.590</td>
<td>(\leq)0.001</td>
</tr>
<tr>
<td></td>
<td>Retrowalking</td>
<td>0.93(\pm)0.12</td>
<td>1.08(\pm)0.14</td>
<td>-6.323</td>
<td>(\leq)0.001</td>
</tr>
</tbody>
</table>
Table 3. Comparison of mean scores of variables between conventional and retrowalking group

<table>
<thead>
<tr>
<th>Variables</th>
<th>Conventional group (n=21)</th>
<th>Retrowalking group (n=21)</th>
<th>t value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain (VAS)</td>
<td>2.71± 0.89</td>
<td>4.97± 0.75</td>
<td>- 8.83</td>
<td>≤ 0.001</td>
</tr>
<tr>
<td>Physical disability (WOMAC)</td>
<td>19.89 ± 3.42</td>
<td>26.05 ± 5.70</td>
<td>- 4.24</td>
<td>≤ 0.001</td>
</tr>
<tr>
<td>Balance (TUG)</td>
<td>0.42 ± 0.22</td>
<td>1.03 ± 0.70</td>
<td>- 3.83</td>
<td>≤ 0.001</td>
</tr>
<tr>
<td>Step length (cm)</td>
<td>0.24 ± 0.44</td>
<td>1.38 ± 0.86</td>
<td>- 5.41</td>
<td>≤ 0.001</td>
</tr>
<tr>
<td>Stride length (cm)</td>
<td>0.38 ± 0.59</td>
<td>2.52 ± 1.29</td>
<td>- 6.93</td>
<td>≤ 0.001</td>
</tr>
<tr>
<td>Cadence (steps/min)</td>
<td>1.90 ± 1.14</td>
<td>4.62 ± 1.20</td>
<td>- 7.52</td>
<td>≤ 0.001</td>
</tr>
<tr>
<td>Walking speed (m/s)</td>
<td>0.09 ± 0.08</td>
<td>0.16 ± 0.09</td>
<td>- 2.57</td>
<td>≤ 0.05</td>
</tr>
</tbody>
</table>

DISCUSSION

Pain and disability were significantly reduced post intervention in both groups with a greater decline in the retrowalking group. The findings are in line with the former studies that have confirmed the benefits of retrowalking on pain and physical functions in knee osteoarthritis [13-14, 17]. Isometrics, range of motion and stretching exercises lead to an overall rise in the strength of the lower limb musculature thus reducing pain and disability [23-24]. Backward walking is a closed chain exercise capable of causing a decrease in the patella-femoral compression forces, reduced force absorption at knee, increase in quadriceps strength and reduced eccentric patellar tendon loading [25-29]. Thus, it possesses greater functional benefits which could be the possible reason for pain and disability reduction in the retrowalking group.

Balance was improved in both the groups after six weeks of intervention but a greater improvement was seen in retrowalking patients. The findings of the present study are consistent with conclusions of many previous researches. The integration of the sensory system, the motor system and the musculoskeletal system is related with improved balance after backward walking [10]. Retrowalking causes an increase in the knee extensor strength, alters the pattern of muscle activation, decreases compressive forces and thus pain in the knee joint, and improves motor control ability leading to an improvement in balance [10,12,16,30-32].

Greater improvement was evident in the retrowalking group for all gait parameters. This is the first study to evaluate the effects of retrowalking on gait parameters such as step length, stride length, cadence and walking speed in patients with knee osteoarthritis. The beneficial effects of backward walking on gait parameters have been investigated in stroke and cerebral palsy which have been attributed to reversal of temporal cycling of the muscle contractions and an improvement in balance as well as motor function of the lower limbs leading to improvised gait performance [11, 32].

A study concluded that backward treadmill walking was capable of achieving sufficient stimulus to augment hamstring flexibility [9]. This reason may have increased the step length and stride length in knee osteoarthritis patients. Antero-posterior balance, step length and velocity in healthy adults were improved after backward walking in another study due to greater stimulation of lower limb muscles, greater activity of quadriceps muscle and high energy consumption [33]. A rectification in the abnormal gait after retrowalking in the present study enhanced the gait performance.

CONCLUSION

Retrowalking given along conventional exercise program for six weeks decreases pain, disability, improves balance, step length, stride length, cadence and walking speed in knee osteoarthritis. Although present investigation involved local patients who participated in study, a larger cohort study involving more number of patients of different races and diverse stages of osteoarthritis are required. Also, future studies could be done using gait laboratory for more accurate interpretation of results. The experimental outcomes of this study will be helpful for physicians and physiotherapists in deciding the exercise protocols
to achieve better results in patients suffering from knee osteoarthritis.

Conflict of Interest- None

Source of Funding- Self

Ethical Clearance- The ethical permission to conduct the study was acquired from the Institutional Ethical Committee (vide letter no. PTY/2015/800 dated 03/11/2015).

REFERENCES


19. Olaogun MO, Adedoyin RA, Anifaloba RO. Reliability and concurrent validity of visual analogue scale and modified verbal rating scale of pain assessment in adult patients with knee osteoarthritis in Nigeria. South African Journal of


To Live or to Leave? – The Ethical Factors Influencing the Parsi Community’s Health

Shraddha Dhal
PhD Research Scholar, English, School of Humanities, KIIT Deemed to-be University, Bhubaneswar

ABSTRACT

A healthy living and a healthy community complement one another. A healthy living can undoubtedly ensure the health of a community. A community’s health is strongly affected and influenced by its members, their individual health and habits, morals and principles, their perspectives towards life in general and particular, the social capital, the immediate environment and of course the religious and spiritual bent of mind of its people. The deterioration of the health of a community may result in significant changes in its population rate. It is thus very imperative that such an important issue needs to be addressed. The unique Parsi community though an essential part of India’s multi-cultural fabric and diversity, is perhaps the only minority outside Europe to have the combination of a higher proportion of older inhabitants and a lower fertility rate. This holds the possibility of a total ethnic extinction of this minority despite having the potential to contribute substantially towards the overall growth of the country. But no matter how alienated as a minority it feels, it must always be protected at any cost. The present paper makes a humble attempt to bring to community health improvement of the Parsi people an approach that emphasizes on identifying various factors held responsible for the rapid decline of the Parsi population. Such an approach would facilitate in protecting and subsequently intensifying the growth of the community.

Keywords: Parsi community, Minority, Health, Declining population, Survival.

INTRODUCTION

A community’s health is greatly affected and influenced by its members, their personal health and habits, their ethics, perspectives towards life, their social capital, the immediate environment and of course their religiosity and spirituality. The small yet unique Parsi community is no exception. The community which had fled to India from Iran some 1200 years ago to escape religious persecution by the fanatical Muslim invaders could stand independent on the Indian soil on the execution of some terms and conditions: to adopt the local Gujarati language as well as the local dress code; to hand-over their weapons and embrace peace; to venerate cows; to not to spread their religion outside their community; and to perform their marriages in the dark as the Hindus do. A community which is well known for its uphill struggle, an astonishingly high presentation among the upper echelons of our society, for its honesty, integrity and fidelity, the Parsi emigrants had proved to be immensely loyal towards keeping their oath intact in all situations. This had in many ways prevented their complete assimilation into the Indian society and ultimately handicapped the growth of the community in terms of demography, which has become the most alarming discussion of the community.

The community becomes the victim of its own success. Despite an illustrious past and an enduring success, their numbers are declining so fast that their survival in the next century has become a question of debate. According to the 2001 census, their numbers have fallen off from 115,000 in 1941 to 69,601 in 2001, out of which around 40,000 are scattered across the globe. The numbers are believed to have declined further since then. It has been declining by 12% every census decade. The consistent sliding represents a tragic loss of cultural diversity for the Parsis. The community, though an essential part of India’s cultural fabric and diversity, is perhaps the only community outside Europe to have experienced a population and fertility decline. The four minorities constitute 5 per cent of the country’s total population. Of this, the Christians account for 2.3 per cent, Sikhs for 1.9 per cent, Buddhists for 0.8 per cent,
research conducted in the year 1973, it has been proved of bachelors and spinsters in the world. According to a community which has unfortunately the highest number at about this level ever since (Patel 2010). This is the for women and 31.4 years for men, and has hovered The average age at marriage in 1962 was 26.5 years fertility, thus impacting the growth of the population. identified as potential issues contributing to the reduced never get married or choose late marriage, have been A large numbers of women, who however, results in rising problems over the availability and a successful career to marrying at an early age. This, as a result of course an accelerated migration to the west often contribute to the drastic reduction in the population of the community.

Surveys show that late marriages and voluntary or involuntary childlessness are some of the prominent factors for the decline of population in the community. Deaths have consistently outstripped population replacement rate since the 1950s, possibly due to medical and socio-cultural reasons. Further, the percentage of elderly population in the total population is as high as 31.0 per cent, as per the 2001 Census (Paul). For every 4 deaths in the community only one child is born, which is quite low as a birth rate. Deaths have exceeded births in every year since 1955. While the ageing was at 23 per cent compared to the national average of 7.7 per cent the age group of children below 15 years was 10 to 12.5 per cent as compared to 33 per cent the ageing rate was rapid even compared to most advanced countries where Canada has 9.5 per cent, USA 11.5 per cent and 15.1 per cent in United Kingdom. Moreover, the replacement level of ageing population with the younger persons was merely 1.1 per cent.

Another vital factor that leads to an alarming deterioration of the Parsi population is its socio-cultural aspect. As the community gets highly urbanized and polished in course of time, women become more conscious of their future and prefer higher education and a successful career to marrying at an early age. This, however, results in rising problems over the availability of brides to marry. A large numbers of women, who never get married or choose late marriage, have been identified as potential issues contributing to the reduced fertility, thus impacting the growth of the population. The average age at marriage in 1962 was 26.5 years for women and 31.4 years for men, and has hovered at about this level ever since (Patel 2010). This is the community which has unfortunately the highest number of bachelors and spinsters in the world. According to a research conducted in the year 1973, it has been proved that women among aged 31-45 years, 27% had never married.\(^1\)

Researches prove that the total fertility rate (TFR) of the Parsis has been waning off for over a century. It has dipped below the viable rates. This is not because the Parsis are biologically infertile but because of their individual choice. Only one out of nine Parsi families has a child under the age of 10 years. Even couples who can have babies do not want to have because of other priorities. When in 1881, the total fertility rate among the Parsis in Bombay was 4.41 (Visaria, 1974), it comes down to 0.94 in 1999 (Unisa et al. 2008). 1961-70 was the first period when the TFR was found to be below replacement level (Visaria 1974).\(^2\) Between 2005 and 2014, only 43 births were recorded, though there were 176 deaths. The first 50 days of 2015 recorded two deaths and no birth.\(^3\) This is an outcome of the fact that more than the average Parsi women either do not get married or choose to marry between 35-40 years at which stage, a woman generally loss her important fertility years and find it difficult to conceive. Couples, who decide upon a baby, go for a single child (0.8) throughout their life time to avoid family obligations in their professional front. Apart, more than average couples have the responsibility to look after five or more elderly persons in the family. That could also be listed as one of the important reasons of not planning for a second baby. Aditi Kapoor in her article ‘The Parsis; Fire on Ice’, writes in the following manner “unless something is done to augment their fast depleting numbers and to revive their religion, the Parsis after an illustrious past could well just fade out in oblivion”.\(^6\)

On one side, no marriage and late marriage have become trends among the community members, while on the other side marriage outside of the community is frowned upon. The community fears getting merged with other dominant cultures. They believe that if their ethnic identity is lost, that may raise questions against their value system eventually leading to the collapse of a brand image. A pure Parsi blood is the key to protect the Zoroastrian root is what the Parsis have believed right from the beginning and they remain stick to this in order to avoid community crisis. Therefore, children born out of mix marriages are not considered to be Parsi as they are not allowed to enter the fire temple, neither are they allowed to perform their navjyot ceremony. As a result the community does not get any chance to escalate its number.
marriages between cousins, uncles and nieces have become the demand of the community. Based on the genealogical database of the Parsi population, it has been studied that the Zoroastrians’ breeding among themselves has led to an increased genetic traits often resulting in genetic diseases and disorders, longevity and reduced fertility.

As Parsis are thought to be genetically homogenous, a number of researches have been conducted on the community members to identify genes involved in various diseases like cancer, multiple sclerosis (MS) and neurological movement disorder like Parkinson, to develop new treatments and diagnosis for the same. It has been identified by a study conducted of by the Mumbai Cancer Registry that the community is particularly vulnerable to endometrium, lymphomas and leukemia, thyroid, pancreas, bladder, corpus uteri, and prostate cancer, which is twice as susceptible as compared to the non-Parsis. The research was conducted by distributing questionnaire among a large group of Parsis regarding their life styles. It found that factors like literacy rate, socio-economic condition, living habits and westernized dietary are particularly contributing to the problem. Apart, the role of an increasingly limited pool also occupies an important role in accelerating the process of extinction in the community.

According to the Deputy Director, Mumbai Cancer Registry, the Parsi women are more prone to breast cancer than the non-Parsis. The affliction is present 1.6 times higher than that of the other communities. In fact, it is the second commonest disease seen among the female Parsis of Bombay. Infrequent breast feeding, fecundity which leads to inbreeding are sighted as some of the major causes of breast cancer among the Parsi women. Apart, cancers of the cervix, corpus uteri, ovarian cancer, cancer of the fallopian tube are also quite frequently diagnosed among the Parsi females. A review of literature on cancer risk among the Parsis in Bombay presents a direct estimation of the true level of cancer risk in this community as compared to the total population of Bombay. Surveys show that the Parsis rank second in broad ligament, ovarian, and fallopian tube cancer (Bombay Cancer Registry). As far as the Parsi males are concerned, they are more prone to prostate cancer. Age- specific rates illustrate that the prostatic lesions start occurring between the ages of 40- 50. However, the highest occurrence is found between 65-69 (Bombay Cancer Registry).

As a highly prosperous, philanthropic and civilized community with an abundant contribution to the growth of modern India, we perceive that the community members have proved to be so diligent that they ignore their social and biological life. On one hand, they marry late or do not marry at all and restrict themselves to a single child even if they do. On the other hand, the members of the community are playing against these deadly diseases, which have made its survival almost impossible in the next century. Thus, to increase the number in order to save the dwindling community from total extinction in the near future is the need of the hour. In this regard, the government, officials and community leaders have agreed to increase its birth-rate by adopting various possible methods to halt a decline towards extinction.

The following measures have been taken which may add substantial value to the population growth of the community while at the same time they would also check the further decline in the number.

The UNESCO Parsi Zoroastrian project namely Parzor Project has been jointly initiated by the Bombay Panchayat and UNESCO in the year 1999 to prevent population crisis in the community and to promote and preserve the great Zoroastrian culture and legacy. The project also intends to establish a connection among the people of Afghanistan, Uzbekistan, Pakistan, and Iran as these countries are the rooms for many Parsis.

To help the Parsis increase their population and become an influential community the Ministry of minority affairs launched a scheme called Jiyo Parsi in 2013. The scheme is funded by the Government with an objective of creating awareness among the community members for lineage inflation. The scheme is executed in two parts: advocacy and medical assistance for reproduction and financial help for women health. The former works with a purpose to act upon family planning, convincing young Paris to get married soon and have more children at the right age, whereas the later offers financial support to the married couples facing fertility problems. Adopting scientific protocols and structured interventions are what the community members are recommended to do.

The second phase of Jiyo Parsi that came up towards the end of 2017, covers expenses of child care as well as of elderly dependents.
Besides, enlightenment through different magazines, articles, books, counseling, giving a broader perception of the present demographic figure of the community, helps its members to realize their dwindling number, would attract young Parsis to breed more.

Though very rare, Intercommunity marriage has also been encouraged among the community members to boost up the population at any cost.

Couples undergoing infertility treatment prefer artificial insemination and surrogacy to boost up the population.

CONCLUSION

In an age of globalization, Community health has become a major area of concern. As healthy living can significantly promote a healthy community, factors affecting the health of a community should always be eluded. Values and ethical factors powerfully influence a community’s mental, physical and psychological wellbeing. Being a community that is staring at its extinction, Parsis need to stress their diminishing population so as to realize their existence in the near future and to act upon that. As a unique minority, which has essentially kept its religion unsullied and its core beliefs apart despite powerful influences from other cultures, the community deserves to be protected and preserved at any cost. There is a dire need to identify, introspect and comprehend the existing issues first at the individual level and then it needs to be addressed at the community level in order to strengthen the population and sustain the identity whose demise would be a major loss to world culture.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not required

REFERENCES


A Review on Plasma Glucose: Preventing Mongering of Madhumeha

Basavaraj S Hadap¹, Anupama V. Nayak², Rajesh Kamath³

¹Professor, Division of Ayurveda. Center for Integrative Medicine and Research, Manipal Academy of Higher Education, Manipal, ²Lecturer, Division of Ayurveda. Center for Integrative Medicine and Research, Manipal Academy of Higher Education, Manipal, ³Assistant Professor, Prasanna School of Public Health, Manipal Academy of Higher Education, Manipal

ABSTRACT

People believe that the new is better than the old, that the advanced is better than the simple, that more is better than little. How good is plasma glucose screening? Statistical medicine, sold all over as very scientific originates from scandal of poor research says Douglas G Altman, head of the medical statistics, London. Ayurvedic health care providers following International diagnostic criteria of Diabetes Mellitus for diagnosis of Madhumeha (Diabetes Mellitus). This was recently proved to be disease mongering and selling sickness. Many studies have consistently demonstrated that history taking and physical examinations are the most important factors in arriving at correct diagnosis, whereas lab tests play only minor role and too often palpably illogical laboratory findings are accepted without question. Ayurvedic physicians should strictly follow classical method of diagnosis of Madhumeha. The quotation from a Cardiologist Mimi Guarneri “Beyond the power of most sophisticated medical equipment is a physician’s humanity – the listening ear, the healing touch, the devices of healers throughout time”, holds good at this juncture

Key words: Madhumeha; Diabetes Mellitus; plasma glucose; Screening; Disease mongering

INTRODUCTION

Majority of Ayurvedic physicians, having a great influence of poor research based western medicine gradually are going away from clinical symptoms of diseases in general and Madhumeha (Diabetes Mellitus) in particular based on laboratory results. If laboratory reports are abnormal, asymptomatic healthy person is medicalised and drugged or operated upon, irrespective of truth whether he or she is suffering or not. It is unfortunate that such a great science Ayurveda which has existed for “times out of mind” in India is slowly deviating to follow the modern medical system of laboratory diagnosis even in the well segment of the population. Even in the western medicine treatment of asymptomatic hyperglycemia has been shown to be futile, if not dangerous. Even the newly invented disease in western medicine IGT (Impaired glucose Tolerance) has been shown to benefit more by life style changes rather than modern medicine like Rosiglitason in a large study.

Euboxic Ayurvedic doctors have been neglecting the definition of disease defined in different classics of Ayurveda, as a state in which both the body and mind are subjected to pain and misery. Chambers Dictionary also defines disease which is similar to Ayurvedic definition as an unhealthy state of body or mind; a disorder, illness or ailment with distinctive symptoms. The laboratory diagnostic criteria of Diabetes Mellitus of western medical science which is flourishing with unscientific practice should not be followed for diagnosis of Madhumeha because, the medical profession is being bought by the pharmaceutical industry, not only in terms of the practice of medicine, but also in terms of teaching and research, says Arnold Relman, a Harvard professor and former editor of the New England Journal of Medicine.
Madhumeha vis-à-vis Diabetes Mellitus

“Prakarshen Prabhutam Prachuram Varam Varam Va Mehati Mutratvagam Karoti iti Prameha” Prameha is characterized by increased quantity of urine associated with or without the increased frequency of micturition. Poly urea (Prabhoot Mutratvam) and turbidity of the urine (Avila Mutratvam) are the two cardinal features of this disease. Prameha refers to repeated, excessive and turbid urination in terms of frequency, quantity and clarity. The term “Prameha” has two parts. ‘Pra’ meaning abundant and ‘Meha’ meaning ‘passing of Urine’. Thus Prameha means passing of large quantity of urine. Ayurveda fixed the normal quantity as four Anjalis (1600 ml) and puts frequency of at six.

The aggravated Bahudrava Shleshma (liquid property of Kapha dosha) by its specific etiology initiates the process of manifestation of Prameha (poly urea with turbidity) because of the Saithilyata (lassitude) developed in the body. The Bahudrava Shleshma comes in contact with Rasa (plasma), Rakta (Blood), Mansa (Muscle), Meda (Adipose tissue), Majja (Bone marrow), Shukra (Semen / Ovum), Kleda (moisture), Lasika (lymphatic fluid), Vasa (type of fat) and Ojas (immunity) and while spreading it first gets mixed with Medas (adipose tissue) because there is an increase in the quantity of Medas which is also Asamhata (uncondensed) and Aghana (more liquid) and also because Kapha and Medas share identical qualities. The specific nature of Samprapti (pathophysiology) of Madhumeha (Diabetes Mellitus) brings Sara (essence of tissues) and Dravabhaga (liquid portion) of involved Dhatus (tissues) to Basti (urinary bladder) leading to Prabhoot, Avila and Madhura Mutratvam (sweet urine). Ayurvedic diagnosis of Madhumeha should have this Samprapti not mere increase in the plasma glucose.

Diabetes term is derived from Greek word dia and bainain means through and to go respectively and diabetes literally means pass through. Mellitus means sweet. Thus Diabetes mellitus means passing of sweet urine which gives similar meaning of Madhumeha which refers to literary meaning of honey like urine. Sweet taste of diabetic urine is noticed in 1670 by Thomas Willis and later is showed that sweetness of urine is due to sugar by Mathew Dobson in 1776. Bouchardt and Peligot in 1838 proved that the sugar of diabetic urine is glucose. Qualitative test for urine sugar was perfected by Hermann Fehling in 1848 and semi-quantitative test by Francis Benedict in 1908. The understanding of diabetes mellitus also started with passing of sweet urine not plasma glucose but present day health care providers diagnosing it based on only plasma glucose level. Diabetes Mellitus is known disease from very ancient times. Charaka in his treatise gives a very elaborate clinical description of Madhumeha, which cannot be surpassed by even modern text books.

Ghost of Plasma Glucose and Screening

Random glucose more than 200 mg/dl and Plasma glucose of 126 mg/dl or higher after an overnight fast, documented more than one occasion with associated symptoms are the essentials of Type 1 diabetes mellitus diagnosis. The essentials of diagnosis of Type 2 diabetes are plasma glucose of 126 mg/dl or higher after an overnight fast on more than one occasion and after 75 gm oral glucose, diagnostic values are 200 mg/dl or more 2 hours after the oral glucose. Polyuria, polydipsia, ketonuria and weight loss generally are uncommon at time of diagnosis. Candida vaginitis in women and Belanophosphitis in men may be an associated initial manifestation. Many patients have few or no symptoms. This international diagnostic criterion with no symptoms takes liberty of life and puts healthy individual into bottom less pit till last respiration.

Total body scan (TBS) including plasma glucose has become a routine among educated, economically rich people and national program in developed countries. Whole body scanning is currently marketed in the medical field to make healthy individual ill and who will rarely become healthy as Professor Isan burg says. A study reported in Journal of the National Cancer Institute says that routine screening for prostate cancer using the prostate specific antigen (PSA) leads to over diagnosis. In Netherland, in 1982 around 1000 children were referred to pediatrician after a positive screening result which was shown to be false for congenital hypothyroidism. More test, more false- positive result. This new born and children screening programs with false positive results create potential parental stress. The Pap smear screening program for cervical cancer in Bristol to prevent cancer, where in 13000 women needed to be screened over 20 years to prevent one death. To prevent one cardiac event per year about 1000 patients needed to treat with newly introduced Polypill which is nothing but old wine in new bottle. This is the use of screening which could damage public health and nation treasure. The plasma glucose screening will show natural normalcy in asymptomatic person as abnormal and encourages physicians with linear thinking
to drug healthy mind and body by creating ghost fear. Epidemiologists to cause epidemics predicted that Diabetes affects one in 20 adults world wide and 333 million cases are predicted world wide by 2025 and to sell drugs to increase mortality rate which has been proved by recent clinical trial. Statistical science is one of the leading causes of death in United States of America. To prevent and stop disease mongering The Pew Charitable trust has given US$ six million campaign by name ‘prescription project’ to reduce the influence of pharmaceutical industry marketing on US physicians and doctors-in –training.

Linear versus Nonlinear Science

Professor B.M.Hegde in his classic “What Doctors Don’t Get to Study in the Medical School” says The problems lie in medicine’s difficulties in defining normality, the devil of false positives, and our limited understanding of the natural history of disease. The most common way of defining normal is that the measure lies within two standard deviations of the mean. Defining normal and abnormal plasma glucose level in a dynamic non- linear human body which has the natural super power to manage altered internal environment to great extent is impossible by linear science. Euboxic Ayurvedic physicians should follow the time honored diagnostic methods of health and make use of Trvidha (Three types), Chaturvidha (Four types), Shadvidha (Six types), Ashtavidha (Eight types), Dashavidha (Ten types) Pareeksha (Examination) and Nidan Panchaka (Five methods of diagnosis) for diagnosis of diseases in general and Madhumeha in particular except in rare conditions as Sushruta says to make use of other sciences to come to a conclusion.

Twentieth century great physician, Lord Platt a great teacher of medicine at the university, in 1949 wrote that, if you listen to your patient long enough, s/he will tell you what is wrong with her/him, which supports Ayurvedic Nidana Panchaka concept. Later his students did prove that with a very well executed prospective, double blind, randomized, hi-tech based (even PET scanner) study of the role of history taking, physical examination, and investigations in medical diagnosis. The study showed that 80% of the final accurate diagnosis and 100% of the future management strategies could be arrived at the end of listening to the patient and reading the GP’s referral letter. This is refined slightly by examination and investigations.

Diabetic Medicine 1999 published a revolutionary study report on the effect of insulin on symptomatic and asymptomatic hyperglycemic patients. Quality of life and plasma glucose in insulin treated diabetics clearly showed real relief only in those patients who were symptomatic before treatment. Asymptomatic hyperglycemic patients experienced more problems with social functioning and pain with treatment is the proof for efficacy of drugs in symptomatic hyperglycemia and adverse effect of medicalization. Author’s humble request to Ayurvedic practitioners is to stick to their own diagnostic criteria rather than slavishly follow the modern medical criteria. In other words of Sir William Osler, It is a safe rule to have no teaching without a patient for a text, and the best teaching is that taught by the patient himself. We must understand that Ayurveda is a Holistic, non linear dynamic science unlike the Reductionist science of Western medicine.

CONCLUSION

Madhumehi (Diabetic patient) needs a Vedasindu (Ayurvedic scholar) to understand Madhumeha (Diabetes Mellitus), not a machine. So Ayurvedic physicians should follow classical method of diagnosis of Madhumeha not euboxic diagnosis which is very recently born for disease mongering and to sell sickness.

IEC : Ethical Clearance not required since it is a review of literature

Source of Funding : Self
Conflict of Interest : None

REFERENCES

2. Ray Moynihan, Iona Heath, David Henry, Selling sickness: the pharmaceutical industry and disease mongering. British Medical Journal. 13 April, 2002; 324; 886-890
3. B.M.Hegde. What Doctors Don’t Get to Study in the Medical School? 1ed. Parasa Medical Publisher; Hyadarabad;  2006, 250p
7. Richard Smith, In search of “non-disease”. British Medical Journal. 13 April, 2002; 324; 883-885
9. Richard Smith, Unscientific practice flourishes in science. British Medical Journal. 4 April, 1998; 316; 1036
18. Deborah Josefson Nebraska, PSA Screening leads to over diagnosis, study says. British Medical Journal. 13 July, 2002; 325;61
19. T. Tymstra, False positive results in screening tests: Experiences of parents of children screened for congenital hypothyroidism. Family Practice, 1986; 3;92-96
25. Stewart-Brown Sarah, Farmer Andrew, Screening could seriously damage your health. British Medical Journal. 22 February, 1997; 314;533
26. Editorials, Do epidemiologists cause epidemics? The Lancet. 17 April, 1993; 341(8851); 993-994
31. Michael McCarthy, US campaign tackles drug company influence over doctors. The Lancet. 3 March, 2007; 369 (9563);730
32. Sushruta. Sushruta Samhitaa.6ed. Varanasi; Chaukhambha Orientalia; 1997. 18p
33. B.M.Hegde, Leave the well alone. British Medical Journal. 20 April, 2007; 334,0
Introduction of a Universal EMR Integrated Online Healthcare Management System Mobile App in Hospitals Throughout India and its Benefits to Patients, Hospitals and Governments

Basil Jacob¹, Rajesh Kamath²

¹MBBS. Trainee- Master in Hospital Administration program. Prasanna School of Public Health, ²Assistant Professor, Prasanna School of Public Health, Manipal Academy of Higher Education, Manipal, Karnataka

ABSTRACT

Healthcare was,is and always will be a booming sector for business with a lot of scope for progress for the country. With the advent of mobile technology, it would be imprudent to not consider the integration of mobile technology into the healthcare system. This article looks to briefly explain the advantages of having a mobile app for the collection, processing & distribution of data to result in improved patient care on the patient’s side, decrease in costs on the hospital’s side and improvement in the overall condition of health on the country’s side, through something as small as a mobile app.

Key words: Universal EMR, Integrated online healthcare management system.

INTRODUCTION

The penetration of smartphones into healthcare settings has increased due to the requirement for faster access to information, which could reduce morbidity, mortality and costs. Smartphone apps have transformed the way in which hospitals work by having an everlasting impact on the healthcare industry in various fields not only on the clinical side but also on the administrative and management sides of the hospital. Healthcare majors like Kaiser Permanente and Cigna have jumpstarted this part of the healthcare industry with innovative tech solutions to help doctors, hospitals and life science organizations become more efficient.[¹] Previously, the healthcare sector was focused more on the manufacture of medical supplies and devices for various healthcare settings. But presently, trends have changed and they have transitioned to custom-tailored mobile applications that have higher functionality and ease of use to the point that it is contributing in bulk to the AI industry in the field of healthcare. The goal of these solutions is to slash healthcare expenditure and to cater to patients to bring about better quality and faster results in healthcare.

Quality

Many studies have looked at whether or not EMRs actually enhance the quality of healthcare delivered.[²] A 2011 study in diabetes care showed evidence that healthcare settings having an EMR system provide improved quality of patient care.[³] The EMR system will ultimately enhance care coordination as well. Since authorized personnel using an EMR system can electronically (even with a smartphone) view the patient’s complete medical history, it reduces the chances of guessing histories and frequent and numerous specialist visits. It allows appropriate urgent care in emergencies. EMRs in a way promote prevention by presenting doctors and patients with faster and more accurate retrieval of test results, spotting of missing patient data and making available evidence-based suggestions for preventive services.

Corresponding author:
Rajesh Kamath
Assistant Professor, Prasanna School of Public Health, Manipal Academy of Higher Education, Manipal, Karnataka
Implementation of an EMR system can effectively bring about a drop in the identification time of patients after hospital admission. A research study in the Annals of Internal Medicine shows that after the adoption of an EMR system, a significant drop in time of 65% had been observed (from 130 to 46 hours). [4]

Countries like Australia, Canada, United States, Sweden, Finland, Netherlands, Denmark, Estonia and even the UAE had started implementation of EMR (Electronic Medical Records) as early as the 1990's. [5] In China, they have been able to create a system where EMRs from all primary, secondary and tertiary hospitals have been compiled to form ‘Big Data’ which is later used for various government projects.

Big data and its applications.

Big data has been defined as “high-volume, high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making and process automation.” [6] China is already making use of big data with almost 90% of its hospitals using an EMR system. Such systems are currently being used for public health promotion (disease monitoring and population management), healthcare management (quality control and performance measurement), drug and medical device surveillance, routine clinical practice (risk prediction, diagnosis accuracy, and decision support) and research. As of 2016, numerous academic research projects have used many national datasets collected by means of electronic software or apps (using desktops and smartphones) to predict and foresee the present and future clinical and economic burden of chronic diseases like cardiovascular disease, diabetes, kidney disease and chronic obstructive pulmonary disease. Moreover, other national administrative databases, inclusive of most of the national standardized discharge summaries of in-patients and the national death registry along with hundreds of millions of patient records, have been used by medical and public health researchers.

Such kind of big data that can easily be used to survey trends and correlations among major diseases in turn provides substantial evidence for healthcare policy making. Newer implementations of data analytics, like machine learning to replace much of the work of radiologists and anatomical pathologists, may also be used and is a booming area of study in China currently. Such applications need in-depth, higher-quality clinical information along with long-term follow-ups and hence need to be studied more in China’s case.

Why the need for Universal EMR Integrated Online Healthcare Management System?

Hospital Information System (HIS) is an essential component of healthcare that is responsible primarily for the administrative needs of a hospital or a healthcare setting. In various settings a HIS is also a comprehensive integrated data collection system pioneered to deal with most requirements of a healthcare setting’s operation, including but not limited to medical, managerial, financial and legal concerns and also the related handling and delivery of services.

A HIS usually handles official documentation, financial situation reports, personal data, utilities and sometimes even stock amounts. Of utmost importance to HIS is the security of information like patient data, patient medical history, prescriptions, procedures, operations and lab test results. By doing so, they also provide a universal source of information about a patient’s medical history that can be accessed by authorized personnel like physicians or nurses (or maybe even the Government in the future for specific surveys). Such a system can multiply many folds the capability of healthcare workers to coordinate and efficiently provide care, by providing immediate access to the patient’s health history and records. A patient’s lab test data contains visually interpreted results like X-ray, CT, MRI etc, which may be accessible by means of digital versions available on the personnel’s smartphone. A HIS also acts as a means of communication among healthcare providers internally within the organization.

METHODOLOGY

Review of literature, Online search and Interview.

DISCUSSION

Interview with Dr. Basil Peechakara, who is an Indian educated prospective US residency applicant. He has passed his USMLE steps and applied for residency positions in the US after completing quite a few clerkships at various hospitals of one of the best hospital groups in the United States: Cleveland Clinic. This interview is on the American healthcare system and “paperless hospitals”— specifically the use of smartphones to collect,
gather and process data in hospitals by means of apps.  

Q) As a future medical resident working in the United States already using an app for hospital administration, what would be your opinion on the use of such apps? How has it helped the clinical side?  

A) It helps the clinical side by reducing the clutter of clerk work which exists if there is no electronic medical record. It also provides a standard for documentation and orders to nurses/pharmacies which otherwise is ill defined if written on paper.  

Q) How many other hospitals in your knowledge use this technology?  

A) I have seen this system only in the US. But I have heard from my friends that at least lab reports are uploaded in a software in some Indian hospitals for prompt delivery to the doctors. I have not worked in many Indian hospitals.  

Q) How likely are you and your peers to recommend such an app to others?  

A) I would highly recommend such technology because it is time we embrace it and stop relying on outdated protocols involving human labor.  

Q) How do you think it can benefit the hospital?  

A) It would be useful to have centralized medical records accessible throughout the hospital by medical professionals.  

Q) Would you want to add anything else?  

A) The main hurdle in its implementation is changing the outlook of veteran doctors who have relied on paper their entire careers. Change needs to be embraced to push Indian hospitals to become on par with hospitals abroad.  

Advantages of having Hospital Administration apps.  

**OPD Management**  
The app could become the perfect solution to outpatient management problems and help streamline processes including patient registration (online appointment booking through the app while using one’s smartphone) and also appointment rescheduling and cancellation. The streamlining nature of the app would help in establishing a better queue management system (at admission and registration counters, billing counters, pharmacies, labs etc.) and inventory management system. Clinical consultation recording including patient history/allergies, problems, examinations done, diagnostic tests prescribed, diagnosis, treatment plans, prescriptions and lab test requests and results, billing etc can all be entered/ordered using a smartphone from anywhere by authorized personnel. Inpatient care management solutions including admission, triage, nursing care and doctor care can be administered. Drug administration and prescription can be done entirely within the app with the help of integration with hospital pharmacy and billing. An integrated inventory management system can be operationalized along with bed and ward management, problem/diagnosis recording, surgery requests and scheduling. Discharge summary with billing and other care record inclusion before final sign-off all can all be done using a single app on the phone. In bed and ward management, colour codes can be used to distinguish between free, occupied and in-preparation beds.  

Laboratory/Diagnostic management: The app could enable immediate lab/diagnostic requests, store results and send back reports online, decreasing the need for manpower for logistic of the said results or personnel rushing to the nearest computer.  

Integration of OPD, IPD and radiology departments through main server with subsequent linkage to billing.  

**Invoice/billing management**  

Invoicing could be seamlessly integrated with the inpatient, outpatient and inventory management systems with the help of strong back-end support (large databases for excess data storage and stable servers for the app to run).  

One could see in real time, paid and unpaid patient invoices along with advance payment and part-payment options reducing the need to physically go to the billing department and print invoices (and rather save a huge sum on stationary not to mention a reduction in requirement for manpower).  

**Inventory management**  

Stock keeping of various commodities such as pharmaceutical products, stationary, disposables, laundry etc.  

Strategic compartmentalization of various stock
types for more efficient allocation of resources to respective departments.

Real time updates on stock levels for future references.

**Pharmacy management**

An appropriate pharmacy management within the APP could include inventory and stock-taking, low stock alerts with the option to dispense batch closest to expiry earlier.

Eradicating errors caused by manual intervention or workarounds.

Avoiding drug diversion and manipulation.

Executing compliance protocols and monitoring compliance violations.

Ability to trace delivery of medical supplies in real time within an entire healthcare setting.

Online Point of sale (POS) module to manage and control sales, generate reports based on daily, day-wise, monthly, month-wise or yearly sales made. POS could incorporated along with inventory management system as well.

Enhancing inventory control and decreasing costs along with prior purchase order generation notifications for low-stock & new stock items.

**Data analytics**

Data analytics within a hospital setting could help better understand patient trends and the hospital’s performance by means of data intelligence.

The app could be used to view multi-dimensional interdepartmental data and gain deep access into more specific details that might be important in strategic decisions.

Graphical display of data like for eg:- most commonly prescribed medicines, most demanding issues, patient visit frequencies, demographics of patients registered with hospital, tests most frequently conducted etc.

**Administrative settings**

Easy to use administrative settings to assign rights and privileges to various hospital users e.g. front staff, nurses, doctors, surgeons, support staff etc.

Customize and/or add hospital letters such as Sick Notes, Referral Letters and Transfer Notes etc.

Improves on responsiveness and patient satisfaction.

Enhances patient care by sending data to the (POC) Point Of Care as opposed to an administrative location.

Creates a system devoid of miscommunication and confusions.

SMS services could be made available in app to communicate effectively with patients.

Apply and alter various hospital service rates and discounts.

Deriving more efficient workflow processes.

Integration of all administrative work within the hospital.

With this, the costs generated on repetitive creation of reports, maintenance of physical records and the resource allocations for the same can be drastically brought down. This ultimately would aid the hospital management to minimize a large section of their expenditure.

Proper feedback systems may also be introduced to patients in lieu of small discounts on their next visit.

Patients could be offered special tier level benefits looking at their history and out of pocket spending at the hospitals.

How do hospitals benefit from this?

All of the above salient features of the app used by professionals within the hospital can help in reducing the hospital’s spending on manpower and stationary in addition to saving a lot of time. This will enable the hospital to treat more patients and reduce the opportunity costs incurred. In addition, by adhering to industry regulations such as HIPAA (Health Insurance Portability and Accountability Act), a secure environment could be created for the efficient interchange of clinical data in various healthcare settings. Three level security is present on all major smartphones today which involves pattern drawing, passwords and fingerprint recognition which guarantees safety of data entry by any personnel within the hospital as compared to the non-secure traditional way of stamps and signatures. Patients would
be happier as they would not have to physically carry their documents throughout the hospital as everything can be accessed online.

Why the need for a common centralized app for all hospitals in India?

The government would have access to big data (discussed earlier) through the databases based on data that are collected by single universal app in real time at any given point of time. The advantages in addition to applications would include:

Constant health surveillance of the population. The scope for statistical analysis of the country’s health in this case is boundless.

No need for large investment on data collection means like desktops as it can be collected on a smartphone which almost every professional would have in today’s tech-savvy world.

Lesser manpower and time required to do surveys which could be done in a fraction of the time required now without the app.

It could also contribute a great deal to GOIs ‘Digital India’ Scheme.

This initiative would also help the government keep a tight leash on the limitless nature of the private healthcare sector by having constant access to the data of private hospitals (the bounds would, of course, be negotiated by government and private entities) as well, resulting in less manipulation of records as everything is electronic and has to be updated in real time.

Regular and random data audits of any hospital may be conducted from any place in the country by the Government as all records are available online thereby increasing the minimum healthcare standard of the country and ultimately increasing India’s global healthcare and medical tourism appeal (butterfly effect).

Obstacles to be faced

Servers have to be stable and up and running at all times.

Backend tech for the commissioned app has to be very stable and ready for collection of Big Data. A list of homegrown tech companies could be approached for such services.

Strong intranet and internet connections are required everywhere in the hospital.

The hospital or healthcare setting needs constant and good quality access to the intranet and to the internet.

Veteran doctors need to embrace this idea keeping in mind the bigger picture.

One of the biggest obstacles to be faced would be the acceptance of such an idea among the more experienced veteran doctors who are used to ink and wood and prefer to stay within that framework. To get them out of that safe-zone by helping them to understand that it would make things a lot easier not just for their patients but also for themselves through the implementation of such tech would be a challenge. Training them to use such a system would also be something to keep in mind.

Initial costs to create electronic records and how to view them on devices like Desktops or Tablets.

Conflict of Interest : None

Source of Funding : Self

Ethical Clearance : Taken from Institutional Ethics committee

REFERENCES


6. Luxia Zhang, Haibo Wang, Quanzheng Li, Ming-Hui Zhao, Qi-Min Zhan; Big data and medical research in China. 05 February 2018. BMJ 2018;360:j5910. Available at: https://www.bmj.com/content/360/bmj.j5910
Antibiotic Susceptibility Profile of Methicillin Resistant Staphylococcus Aureus- A Cross-Sectional Study

Kavitha E1,2, Srikumar R3
1Research Scholar, Bharath University, Chennai, India, 2Department of Microbiology, Sri Venkateshwara Medical College and Research Center, Puducherry, India, 3Department of Microbiology, Centre for Research, Sri Lakshmi Narayana Institute of Medical Sciences and Research, Puducherry, India

ABSTRACT

Background: Antibiotic resistance is a worldwide phenomenon observed among clinical isolates of Staphylococcus aureus. The increasing prevalence of Methicillin resistant Staphylococcus aureus (MRSA) demands the availability of other essential antibiotics for the treatment. Our study is conducted to find out the various antibiotic susceptibility pattern observed among MRSA isolates.

Methods: Kirby Bauer disk diffusion method was performed on all the clinical isolates to determine the antibiotic susceptibility pattern and D test to identify the inducible clindamycin strains. Results: of the 573 clinical isolates of Staphylococcus spp, 191 (33.3%) were MRSA which showed maximum antibiotic resistance to erythromycin (60.2%) followed by cotrimoxazole (19.4%) and ciprofloxacin (14.7%). Inducible clindamycin was found to be 24.6% among MRSA isolates. Conclusion: Monitoring of the antibiotic resistance and sensitivity pattern is essential for the effective disease management and complete recovery from the disease.

Key words: D test, Kirby Bauer disk diffusion method, Staphylococcus aureus

INTRODUCTION

Staphylococcus is a commonly isolated pathogen from most of the skin and soft tissue infections. There has been a widespread antibiotic resistance observed among these clinically isolated pathogens, more commonly among nosocomial pathogens1. Staphylococcus aureus is one such pathogen which shows remarkable propensity for the development of various antibiotic resistance2. Inappropriate choice of antibiotic therapy results in a higher rate of increased clinical morbidity and mortality among patients3. Methicillin resistant staphylococcus aureus (MRSA) strains are frequently isolated from hospital and community acquired infections showing multiple drug resistance pattern4. With multiple drug resistance MRSA strains the treatment options become limited. Rapid spread of such antibiotic resistant strains have been reported worldwide especially from the developing countries owing to the misguided use of antibiotics and its easy availability over the counter of pharmacy5,6.

Increased incidence of MRSA cases have been reported from various studies in India as well6. Such increasing incidence of resistance strains in the recent times produces a significant impact on the disease management and treatment of infections7. Hence, control of MRSA emergence is essential in order to manage the introduction and spread of new infections which could be achieved by following universal precautions and updating on the changing patterns of resistance mechanisms by means of regular epidemiological studies8. MRSA shows wide variations in antibiotic resistance patterns by developing chromosome resistance to commonly used antibiotics like penicillin and cepahalosporins which are extensively used in the treatment of skin and soft tissue infections9. Also, the increased emergence of inducible clindamycin resistance (iMLSb) strains among MRSA cases widens the gap of treatment and management of such infections10-15.
To manage the treatment of MRSA and inducible clindamycin resistant cases, the resistant pattern can be easily determined by Kirby-Bauer disk diffusion method and D-test method. The inclusion of D test in the regular clinical diagnostic procedure will further improve the management of the treatment progression with the commonly used antibiotics. Our study thus would help to assess as well as manage the resistant cases and also determine the rate of such cases in this part of the country on a routine basis.

MATERIALS AND METHOD

The present study was conducted in the Department of Microbiology, Sri Venkateshwara Medical College and Hospital, Ariyur, Pondicherry. The study was initiated after getting the approval from the Institute Ethics clearance committee. We analysed 376 strains of *Staphylococcus aureus* which mainly included samples like pus and wound exudates, coming for routine culture and sensitivity to the Microbiology laboratory. The clinical specimens were inoculated on blood agar and MacConkey’s agar, and were examined for bacterial growth after 24 hours of incubation. Colony morphology, gram staining, catalase test, coagulase test, mannitol fermentation, methyl red test, voges proskauer test, nitrate reduction test and urease test were performed to confirm the pathogen. Antibiotic susceptibility was performed for *Staphylococcus aureus* as per the CLSI guidelines.

Methicillin resistance was detected by using cefoxitin disk (30µg) by Kirby Bauer disk diffusion method. Other antibiotics included for observing the various antibiotic resistance included- penicillin (10 units), amikacin (30 µg), ciprofloxacin (5 µg), cotrimoxazole (1.25/23.75 µg), doxycycline (30 µg), erythromycin (15 µg), clindamycin (2µg), vancomycin (30 µg & E strip) and linezolid (30 µg). *Staphylococcus aureus* ATCC 25923 was used for quality control.

Inducible clindamycin resistance (iMLS\(_{B}\)) was detected by using double disk diffusion method (D-test). Lawn culture of 0.5 MacFarland standard of bacterial suspension was made on Mueller-Hinton agar plate. Erythromycin disk (15 µg) and clindamycin disk (2 µg) were placed at a distance of 15 mm apart (edge to edge). The plates were incubated overnight and the zones of inhibition were measured. Flattening of the shape of clindamycin zone facing erythromycin disk giving a D shaped appearance is considered to be positive for inducible clindamycin resistance (iMLS\(_{B}\)) by D-test. Strains resistant to both erythromycin and clindamycin were considered as constitutive MLS\(_{B}\) resistant whereas strains resistant to erythromycin and susceptible to clindamycin were taken as MLS\(_{B}\) phenotype.

RESULTS

Among the 376 strains of *Staphylococcus aureus* isolated from the various clinical samples in our study, 191 were MRSA strains. Most of the isolates were from the age group 31-45 years. On comparision, males (68.6%) were found to be more commonly affected when compared to the females (31.4%). Most of the samples were from pus (47.1%) and exudates (39.3%). The antibiotic resistance pattern of MRSA is shown in Table 1.

Of the 191 Strains, 47(24.6%) exhibited inducible resistant to clindamycin. Table 2 shows the different phenotypes of MRSA based on the susceptibility pattern to erythromycin and clindamycin.

Resistance rates of MRSA strains for more than one antibiotic were also observed among as shown in Table 3. Antibiotic susceptibility pattern for the commonly used antibiotics were compiled and found to be more resistant among MRSA isolates than in methicillin sensitive *S.aureus* (MSSA)(Table 4).
Table 1. Antibiotic resistance pattern of MRSA (N=191) for other antibiotics

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Resistant strains N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin (10 units)</td>
<td>191 (100)</td>
</tr>
<tr>
<td>Amikacin (30µg)</td>
<td>24 (12.6)</td>
</tr>
<tr>
<td>Ciprofloxacin (5µg)</td>
<td>28 (14.7)</td>
</tr>
<tr>
<td>Co-trimoxazole (1.25/23.75 µg)</td>
<td>37 (19.4)</td>
</tr>
<tr>
<td>Doxycycline (30µg)</td>
<td>15 (7.9)</td>
</tr>
<tr>
<td>Erythromycin (15µg)</td>
<td>115 (60.2)</td>
</tr>
<tr>
<td>Clindamycin (2µg)</td>
<td>8 (4.2)</td>
</tr>
<tr>
<td>Vancomycin- E strip</td>
<td>4 (2.1)</td>
</tr>
<tr>
<td>Linezolid (30µg)</td>
<td>4 (2.1)</td>
</tr>
<tr>
<td>Cefoxitin (30µg)</td>
<td>191 (100)</td>
</tr>
</tbody>
</table>

MRSA-Methicillin resistant S. aureus

Table 2: Susceptibility to ERY and CL among MRSA strains (N=191)

<table>
<thead>
<tr>
<th>Susceptibility pattern</th>
<th>MRSA N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERY-S, CL-S</td>
<td>76 (39.8)</td>
</tr>
<tr>
<td>ERY-R, CL-R</td>
<td>8 (4.2)</td>
</tr>
<tr>
<td>ERY-R, CL-S; D test positive</td>
<td>47 (24.6)</td>
</tr>
<tr>
<td>ERY-R, CL-S; D test negative</td>
<td>60 (31.4)</td>
</tr>
<tr>
<td>Total</td>
<td>191 (100)</td>
</tr>
</tbody>
</table>

ERY- Erythromycin, CL-Clindamycin, S-Sensitive, R-Resistant

Table 3. Antibiotic resistance of MRSA strains (N=191) for more than two antibiotics

<table>
<thead>
<tr>
<th>MRSA strains</th>
<th>No of resistant isolates to erythromycin and cotrimoxazole</th>
<th>No of resistant isolates to ciprofloxacin and cotrimoxazole</th>
<th>No of resistant isolates to cotrimoxazole and doxycycline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitive</td>
<td>76 (39.8)</td>
<td>163 (85.34)</td>
<td>176 (92.15)</td>
</tr>
<tr>
<td>Resistant</td>
<td>115 (60.21)</td>
<td>28 (14.66)</td>
<td>15 (7.8)</td>
</tr>
<tr>
<td>Total</td>
<td>191 (100)</td>
<td>191 (100)</td>
<td>191 (100)</td>
</tr>
</tbody>
</table>

MRSA- Methicillin resistant staphylococcus aureus

Table 4. Antibiotic susceptibility results of MRSA strains (N=191)

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Strain (N)</th>
<th>Sensitive (%)</th>
<th>Resistant (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin</td>
<td>MRSA</td>
<td>0 (0.0)</td>
<td>191 (100)</td>
<td>0.000</td>
</tr>
<tr>
<td>MSSA</td>
<td>25 (13.5)</td>
<td>160 (86.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amikacin</td>
<td>MRSA</td>
<td>167 (87.4)</td>
<td>24 (12.6)</td>
<td>0.000</td>
</tr>
<tr>
<td>MSSA</td>
<td>179 (96.8)</td>
<td>6 (3.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>MRSA</td>
<td>0 (0.0)</td>
<td>191 (100)</td>
<td>0.000</td>
</tr>
<tr>
<td>MSSA</td>
<td>25 (13.5)</td>
<td>160 (86.5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cont... Table 4. Antibiotic susceptibility results of MRSA strains (N=191)

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>MRSA</th>
<th>MSSA</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotrimoxazole</td>
<td>154 (80.6)</td>
<td>37 (19.4)</td>
<td>0.008</td>
</tr>
<tr>
<td>MSSA</td>
<td>167 (90.3)</td>
<td>18 (9.7)</td>
<td></td>
</tr>
<tr>
<td>Doxycycline</td>
<td>0 (0.0)</td>
<td>191 (100)</td>
<td>0.000</td>
</tr>
<tr>
<td>MSSA</td>
<td>25 (13.5)</td>
<td>160 (86.5)</td>
<td></td>
</tr>
<tr>
<td>Erythromycin</td>
<td>76 (39.8)</td>
<td>115 (60.2)</td>
<td>0.000</td>
</tr>
<tr>
<td>MSSA</td>
<td>123 (66.5)</td>
<td>62 (33.5)</td>
<td></td>
</tr>
<tr>
<td>Clindamycin</td>
<td>183 (95.6)</td>
<td>8 (4.2)</td>
<td>0.061</td>
</tr>
<tr>
<td>MSSA</td>
<td>183 (98.9)</td>
<td>2 (1.1)</td>
<td></td>
</tr>
<tr>
<td>Vancomycin</td>
<td>187 (97.9)</td>
<td>4 (2.1)</td>
<td>0.048</td>
</tr>
<tr>
<td>MSSA</td>
<td>185 (100.0)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Linezolid</td>
<td>187 (97.9)</td>
<td>4 (2.1)</td>
<td>0.048</td>
</tr>
<tr>
<td>MSSA</td>
<td>185 (100.0)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Cefoxitin</td>
<td>0 (0.0)</td>
<td>191 (100)</td>
<td>0.000</td>
</tr>
<tr>
<td>MSSA</td>
<td>25 (13.5)</td>
<td>160 (86.5)</td>
<td></td>
</tr>
</tbody>
</table>

MRSA-Methicillin resistant *S.aureus*; MSSA- Methicillin sensitive *S.aureus*
(P<0.005 is significant)

DISCUSSION
Our study highlights the increased incidence of MRSA strains (191) isolated form skin and soft tissue infections as reported in previous studies[19,20]. Out of 191 strains, 24.6% were inducible clindamycin resistant. Though the isolation rate of MRSA strains was high, these strains showed good susceptibility to other antibiotics commonly used for the treatment. Antibiotics like amikacin, doxycycline, clindamycin and cotrimoxazole are great choices for treatment of such antibiotic resistant strains. In-vitro determination of antibiotic resistance of *Staphylococcus aureus* with special reference for MRSA is essential in selection of effective drugs for the staphylococcal diseases and infections[21]. Also such strains are becoming multi-drug resistant and developing increased resistance to second line antibiotics.

MRSA strains in our study also showed multidrug resistance as observed in other studies[22,23]. There is also an increase in resistance for vancomycin and linezolid which are the most important antibiotics for the treatment of MRSA infections[24,25]. In our study, 2.1% of MRSA strains showed resistance towards vancomycin and linezolid. All the strains were resistant to penicillin (100%). Inducible clindamycin resistance was found to be 24.6% which was in accordance with the other reported studies[26,27]. Detection of inducible clindamycin is essential in order to avoid treatment failure with this potent drug which could be absorbed by the system very easily. Though, the emergence of such strains is rampant with the MRSA isolation, judicious choice of antibiotics can help in the outcome of patient cure.

Strength of the study
As reported in various studies, simultaneous detection of antibiotic resistance and inducible clindamycin resistance among the clinical isolates proves very beneficial in the care and management of the clinical outcome which was also highlighted in our study.

Limitations of the study
Being a cross sectional study we could not indicate cause-effect relationship. Also, small sample size is a limitation in our study. Resistant isolates has to be studied at molecular level via PCR methods.

CONCLUSION
Increased rate of MRSA strains isolated in our
study with multiple drug resistance and also inducible clindamycin resistance indicates the importance of rapid identification of such strains before the initiation of antibiotic treatment.

Source of Support: Nil

Conflict of Interest: None.

Ethical Clearance- The study was commenced after getting approval by the Research and Institute Ethics Committee of Sri Venkateshvara Medical College Hospital and Research Centre, Ariyur, Puducherry

REFERENCES


18. Baragundi Mahesh C, Kulkarni Ramakant B,


The Multiple Ways of Constructing the Overmind

Rajarethinam Emmanuel¹, S.N. Sugumar², S. Chandrachud³, Chithirai Rajan⁴, M. Ramesh⁴, Telu Suvarna⁴

¹Asst. Professor, Vels Institute of Science, Technology and Advanced Studies (VISTAS), Pallavaram, Chennai, ²Professor and HoD, Economics Department, VISTAS, ³Professor, VISTAS, ⁴Asst. Professor, VISTAS

ABSTRACT

The priorities and focus given by our current neural set-up might help us to win the short-run; but in the context of the overall evolution, the self-centric focus looks absolutely meaningless. As per science and a genuine introspective analysis, the human system is made of nothing other than fundamental particles and the fundamental sensations. In the long run, therefore, one can only identify either with the interconnected cosmic processes or with the conscious energy that appears to direct it towards more valuable and sustainable structures. To control and direct our current levels of self-talk in accordance with the long-term objectives, one needs to develop the over-mind, after the module of many other control systems that have already developed in nature.

Keywords: Teleological Motive, Voluntary and involuntary Memory, Synapse, Plasticity of Brain

BACKGROUND

Despite the fast-track changes in the standards of life, we still need to walk up to the food, extend our hand to push it up to the mouth or to drive away the fly that might come on the way. There’s nothing uniquely different in the manner in which the nervous and the muscular systems function in both animals and human beings for executing such actions.

That which sets us apart is probably something else. It’s just the fact that human beings engage in the construction of statements even as they carry out these utterly mundane activities. Simplistic though it might sound, this facility in itself is a huge development over the previous brain structures. Language function may be seen as the additional layer built over the unconscious mental control of the body such as the reflex movements and the involuntary muscular excitements and inhibitions¹.

The conscious process was developed through attention and is regulated through the recruitment of dopamine in the pre-frontal cortex. However attention isn’t entirely unique to the humans. The only tweak is that we have used the very same brain structure enabling us to pay attention as a convenient tool to build the semantic memory.

The art of language brought with it a whole lot of blessings and burdens as well. Undoubtedly, the type of self-talk we experience at present helps us to deal with much more complex situations than what the other animals can cope with. But it also fills us with endless anxiety and fear fueled by the prior expectations of the worst possible scenarios. Essentially, we are so absorbed in the meaningfulness made available through neural conditioning that we end up as puppets rather than thinkers.

By utilizing the same facility of attention modulated and supported by dopamine one can also elevate the current neural system to a still higher level of meaningfulness. The strategy may be seen as the reciprocal methodology. It is this human possibility and in some extra-ordinary individuals a skill already initiated that we would define as the over-mind.
Sri Aurobindo introduced the term, to mark the penultimate stage of the possible growth of mind, prior to the arrival of the supermind. Over-mind, for Aurobindo, is an intuitive way of finding the unity between the subject and the object. Laudable though it is, this way of description hardly delves into the fundamental elements that have built the macroscopic entities called the subject or the object, at least not in line with the findings of science, including cognitive neuroscience. And for this reason we wouldn’t implicate the doctrine of Sri Aurobindo here. We would merely borrow the term for a different purpose.

Science has accomplished the immense task of finding the real connections in the stunning cosmic evolution even up to the point of the workings of the brain and has implicitly shown to each individual how they are nothing other than a speck of mechanistic and biological streak in the overall evolutionary forward march. It’s high time, therefore, that we reassess the kind of inner talk spontaneously put forward by our neural conditioning. We are in need of re-working the human connectome, taking advantage of the fundamental plasticity of brain. One could call this the conscientious project of constructing the over-mind, which again implies nothing other than a possible new direction of attention, towards some specific objectives.

If attention is all that was required to build complex mental behavior and the language system, a renewed attention to reassess the entire module of self-talk is certainly possible. One can bring about an additional control system right in the midst of the outpouring of our mind similar to the growth of the master control genes and the DNA-binding proteins. It is such deliberate attempt to build a new control system that we have defined as the over-mind.

**MATERIALS AND METHOD**

The Nobel laureate, Sir Charles Sherrington (1857-1952), would be our critical reference, for more than one reason. Sherrington was the first to show to the world that “muscle excitation was inversely proportional to the inhibition of an opposing group of muscles”. The remarkable discovery was termed the ‘reciprocal innervation’. The objective of this article is also nearly similar, although on a purely conscious plane. As neuroscience has come up with all the evidence to show that our current level of self-talk is the excitation of a carefully selected and continually reinforced neural pathways, guided especially by the self-interests of the individual, it just calls for invoking a renewed scheme of attention paid in terms of reciprocal application to fit the self-talk in the context of the overall workings of the entire cosmic system. The moment I recognize that whatever I considered as myself has fallen into one of the many types of the cosmic formulae – in this case, minute sensations building up a huge mental construct as it similarly occurs in billions and billions of other individuals -- there’s no ground on which the traditional ‘self’ can stand any longer, except, of course, the ground of the universe itself. It is this kind of reciprocal deflection of attention, turning an utterly limited concentration to its genuine extensions of all kinds, we would be dealing with here.

In addition, Sherrington has explored the concept of the teleological motive of Nature in The Gifford Lecture series. This is an exceptional work for no other Western scientist of the post-modern era has given us a bold and straightforward approach to the divine starting right from the system of Nature. However, the arguments given here might be still wanting, as eminently pointed out in the review given by William Elis.

The reason again is not far to seek. Sherrington couldn’t move out of the dualistic conception of Descartes, expounded three centuries earlier. Rather than analytically splitting down reasoning and willing back to the minute sensations and the language system built on a specific group of sensations, Sherrington attributed such activities to the soul. This would be unacceptable to any credible scientific methodology, for the current evidence clearly shows that the whole of nature including our mental judgments are made of atomic parts, such as electrons and protons in our neural system or the memory of sensations caused by them.

The argument of the Teleological Drive - traditionally known as the Divine -- can only arise as an analogical one after the module of the mental skills experienced by us, although ours is just an evolutionary set-up. We can also raise the irresolvable question of how the totally varying types such as electrons and sensations finally managed to instruct and influence each other. How the whole lot of minute sensations convert into meaningful summary statements about the entire universe. The Divine motive that has gone ahead and achieved all its works stands out loud and clear, not
only from the fundamental intentional set-ups of nature but more especially from the unnatural links such as electric conduction and the meaningful association of sensations. And it comes out equally impressive when we reflect on the highly inexplicable Big Bang in which all known laws are expected to collapse. Sherrington, for one, hadn’t gone into such acid test arguments.

The crucial data preserved through the historical events of world religions powerfully suggesting the presence of something more fundamental to the universe is an extra boost to any positive conclusion we would make in this direction. The reciprocal control of meaning that we wish to develop as the over-mind stands only to be enriched by clarifying the concept and the material available through religions as well.

THE REASSESSMENT OF SELF-TALK

Nature has consistently built one beautiful structure over the other. The manner it does so is a spell-binding story, with each step getting even more intriguing than the previous one – far more brilliant than any human machine that we have managed to build so far. The habitual workings of our mind is just the top-most achievement of nature until now. And it’s seriously doubted if anything more complex and brilliant than this could be produced through any other lineage of cosmic evolution. But that doesn’t imply the human mind can’t be developed further. The reason why we couldn’t take it to a higher level of operation until now has to do with our failure to see the continuity of all developments. It isn’t a bad idea therefore to list out the significant milestones of cosmic evolution before describing how mind itself can be oriented towards yet another jump-start.

The rapid developments of the very first second of the universe have been theoretically described. From utter fluidity and the highest energy state possible, things got progressively cooler and more expansive, leaving the very first configurations called nuclei and atoms. It took 240,000 years for hydrogen and traces of lithium to be formed and about 240 million years for the first generation of stars to set fire. The medium sized third generation stars such as the sun came into picture 9 billion years later and it took another one and a half billion years for the early forms of cells to appear.

If the self-replicating cell is something unique in all of cosmic configurations, its existence and operation is just unthinkable without the essential prior stages through which the universe had expanded earlier. The planet earth that turned itself into the fitting abode for the arrival of the cell, is held in its rotational movement within the cosmic balance of galaxies and solar systems. It’s obvious therefore that more complex realities have been continuously built within the bedrock of the previous arrangements. Nothing new can ever arise except in and through the laws prevailing earlier.

In the context of the evolution of life, the manner in which the central nervous system finally emerged provides an equally breath-taking story. From the nerve nets and ganglion serving specific functions of the body in lower species, the complex system of cerebellum, the hemi-spheres of cortical lobes and the deep brain parts such as thalamus, hypothalamus, hippocampus and amygdala were gradually put in place. The frontal lobes that enable the executive actions are the latest addendums to this magnificent structure.

While the diffuse nervous system and even the non-human central nervous system were meant only for the co-ordination of the body movements, the control of visceral fluids, detection of food, partner and alarm signals, human beings managed to carve out specific regions in cortices and other brain-parts to produce a new type of memory. It is thanks to the extra-ordinary invention of language and the parallel support system that developed in the brain due to its fundamental plasticity, human beings could go ahead with acquiring knowledge about the whole of universe and converting all of it in verbal notation.

The conscious realm appears to have developed based on the pain and rewards that surrounds the individual. The way to get over this highly concentrated drama is simply by learning all the neural set-ups that favor this specific module and by observing the kind of thoughts and emotions that spontaneously spring up at different moments of life. The closer one captures through the power of attention, the programmed modules of self-talk put forward by the neural system, the more prepared we would be to challenge it and to take it forward to a new scale. The age-old practice of imagining an exclusive entity called ‘self’ or attributing the self-talk to something as mysterious as the soul would begin to thin out under the power of science combined with an introspective analysis.
The Reciprocal Control

This is not to imply that the over-mind is something entirely new to be developed. The extent of inhibitory processes already at work in our pre-frontal cortices has enabled us to choose the most appropriate action, word and behavior, suppressing a whole lot of other possibilities. The over-mind in this sense is already at work in us. What we are suggesting here is that this role could be further refined towards some specific objectives.

It’s only after perfecting hundreds of involuntary muscular controls, one particular section of the sensual data relating either to the sound or the picture of alphabets has catapulted us to a world-wide-web of thoughts, emotions and values. To enjoy the chillness of a bath, one may have to shut down the automatic thought processes that side-track us from the immediate pleasure. Such wisdom was rightly advocated in Buddhist traditions more than two millennia earlier. Attending to just one split second is a brilliant way of avoiding the mega story spun by the mind.

But we also have the freedom to reflect over the beauty of inter-connectedness starting all the way from the early stages of cosmic evolution. The moment we know that the self we had relied on is a construct of nature taking no more than bits and pieces of particles making up the DNA of our cells and bits and pieces of sensations including the language-sensations, the question of the teleological motive in all of universe is bound to haunt our attention.

The meaningfulness given by the language system supported by neurotransmitters and neuromodulators is defining no more than an utterly limited circle at present. Reflecting on the long chain of evolution that has cleverly brought about the construct of the individual self, you would not only feel one with all physical and chemical designs, it would be impossible thereafter to separate yourself from the essential undercurrents of Nature.

The Indian tradition reached out to these truths in its own inimitable style. As per Mandukya Upanishad\textsuperscript{11}, the wakeful and the dream states are caused by the various organs and limbs exposed to the world, while Atman is identified with that which lies beyond deep-sleep. Something keeps you alive even when you deep-sleep. It brings back to you the right kind of memories the moment you wake up. That ultimate base is Brahman, as per the inspiring dialogue between Uddalaka and his son Svetaketu in Chandogy Upanishad\textsuperscript{12}.

The remarkable intuition of the pre-scientific era doesn’t mean one can progress much by going to sleep and acting as if the identity with Brahman is already achieved. On the contrary, right in the wakeful state, if you start focusing on the essential fact that chemical designs are the base of each of your thought and that something else ought to have planned even the complex brain structures, there’s no other go but to find yourself united with the cause of all causes. Again the Upanishadic wisdom is hard to come by without reflecting on the Buddhist ideal of looking at the utterly limited minute parts that build up the whole or without reflecting on the absolute certainty of mind over matter as demonstrated through Jesus of Nazareth or without wondering over the divine act of dismantling some of the misleading statements of Christianity through the Book of the Holy Quran.

CONCLUSION

The human system is dangling between two extremes. It can only split up into the basal elements from which it evolved or it can unite itself with the topmost conscious energy that appears to have guided from within one beautiful construct after the other. The priorities and focus given by our current neural set-up can only give us a façade of meaning and joy. It stands utterly ill-prepared for any of the long-term objectives or significance. To control and direct it as per the huge knowledge available through science, one needs to develop the over-mind, which is already at work in us through some of the religious teachings, social norms and behavior.

Ethical Clearance : COMPLETED

Source of Funding : Self

Conflict of Interest - Nil

REFERENCES

3. Sen I. Sri Aurobindo’s Theory of Mind [Internet] (cited November 4, 2018) Philosophy East and


Are Soft Drinks Soft on Teeth? A Study on Dental Erosion Caused by Soft Drinks Marketed in India

Prajna P. Nayak¹, Nishu Singla², K.V. V. Prasad³, Nandita S Rao⁴

¹Senior Lecturer, ²Associate Professor, Department of Public Health Dentistry, Manipal College of Dental Sciences, Manipal Academy of Higher Education, Manipal, ³Professor and H.O.D., Department of Public Health Dentistry, SDM college of Dental Sciences and Hospital, Dharwad, ⁴Dentist, (DDS) Loma Linda University, California, U.S.A

ABSTRACT

Introduction: Awareness of dental erosion by public is still not widespread, and there is paucity of information on how much erosion do various soft-drinks marketed in India cause.

Objectives: To quantify the amount of erosion that various soft-drinks may cause, in relation to their baseline pH, titrable acidity and calcium contents.

Method: Six types of drinks- Coca-cola, Sprite, Maaza, Lipton iced lemon tea, Tropicana orange juice and yoghurt were used, with water as control. Baseline pH was determined by pH electrode, baseline titrable acidity was determined by amount of sodium hydroxide (NaOH) required for making pH of 5.5 and calcium content by Atomic Absorption Spectrophotometry. Five teeth each of maxillary premolars were randomly allocated into each of 7 groups. After incubation in 100 ml for 2 hours, 12 hours and 24 hours, amounts of calcium released was determined.

Results: Mean calcium release after 24 hours was highest for Coca-cola with lowest pH, followed by Maaza, Sprite, Orange juice, Lemon tea, yoghurt and water, which released 1.38µg/ml/mm², 1.28µg/ml/mm², 0.91µg/ml/mm², 0.49µg/ml/mm², 0.34µg/ml/mm² and 0µg/ml/mm² of calcium respectively. Statistically significant differences were found for calcium release in coca-cola, maaza, sprite and orange juice from baseline to 2, 12 and 24 hours (p-value < 0.00).

Conclusion: Beverages with lower baseline pH and lower baseline calcium concentration showed higher calcium release. Though, direct application of the results of this study to in-vivo conditions cannot be fully made due to other host and dietary factors.

Key words: Dental erosion, Soft drinks, pH, calcium concentration.

INTRODUCTION

One of the most important outcomes of modern lifestyle is the changed eating habits. To keep pace with an expeditious lifestyle, people are resorting to more processed foods and bottled beverages. This in turn, has resulted in an ever increasing prevalence of dental erosion.¹⁹

Dental erosion (DE) is defined as the tooth wear occurring by chemical dissolution caused by acids of any origin.¹¹ Being an inorganic tissue, the integrity of enamel is greatly influenced by the pH and presence of minerals in saliva. Whenever there is a drop in pH of saliva below the critical value of 5.5, tooth enamel is demineralized. The pH above critical pH is regarded as supersaturated and favors crystalization of mineral. Under normal conditions, a tooth does not lose its mineral...
since saliva is usually supersaturated with respect to its mineral concentration. At this pH, the ionic product \((Ip)\) of the mineral is said to be equal to its solubility product \((K_{sp})\). Whenever oral cavity is exposed to acidic foods and beverages, the pH of solution becomes less than critical pH \((Ip<K_{sp})\) and saliva becomes unsaturated with respect to mineral, which then precipitates out into the solution. Frequent and prolonged exposure to low pH may result in a more rapid demineralization of the enamel surface.

Initially DE is manifested as loss of tooth shine, followed by flattening of convex structures. With the continuing acid exposure, concavities form on smooth surfaces and cupping occurs on incisal/occlusal surfaces. DE can be caused due to external or internal factors. Extrinsic factors being frequently consumed acidic foodstuffs or beverages and acidic contaminants present in the working environment. Intrinsic factors are acids regurgitated due to gastro-esophageal refluxes. In the modern societies extrinsic factors are becoming an important cause for erosion due to the increased consumption of acid drinks as soft drinks, sport drinks, fruit juices and fruit teas.

There are studies done in developed countries which measure the erosive potential of soft drinks marketed in their countries. Hence, this study was conducted with an aim to quantify the amount of enamel surface demineralization that various beverages may cause, in relation to their baseline pH, titrable acidity and calcium contents. The objectives were: i. to measure baseline calcium content of various soft drinks by Atomic absorption Spectrophotometry. ii. to measure baseline pH by pH electrode. iii. to measure titrable acidity (neutralizable acidity) determined as the volumes of 0.1 M sodium hydroxide (NaOH) required to increase the pH of 50 milliliter (mL) of beverages to 5.5. iv. to measure and compare calcium concentrations in the drinks after 2 hours, 12 hours and 24 hours.

**MATERIALS AND METHOD**

This invitro study was conducted to quantify the amount of enamel surface demineralization that various soft-drinks and juices may cause, in relation to their baseline pH, titrable acidity and calcium contents.

**Analysis of pH, Titrable Acidity and Calcium:**

Six commonly available soft drinks and juices in the Indian market were chosen for study. The following drinks were used: Coca-cola™, Sprite™, Maaza™, Lipton Iced tea™, Tropicana orange juice™ and Danone yoghurt™. Water was used as a control.

Immediately after opening the bottles, their pH was determined at 25° C by pH electrode (Micropro – Gradmate). Three pH readings were measured for each beverage and the mean value calculated. The buffering effect of each drink was determined by monitoring pH after serial additions of 0.025 mL of 0.2 mol/L of sodium hydroxide (NaOH) to 5mL of each drink. Then, their Calcium concentrations were determined by Atomic Absorption Spectrophotometer (Thermo Jarrel Ash Atomic Absorption Spectrometer). Five readings were taken for each beverage and the mean value was calculated.

**Preparation of Enamel Specimens:**

A total of 35 freshly extracted human premolars were collected from young adults, who got their teeth extracted for orthodontic reasons. Immediately after tooth extraction, surrounding soft tissues were removed and were placed in a 0.9 % sodium chloride solution for up to 7 days. All teeth were then examined microscopically for any irregularities of mineralization, especially for genetic diseases of enamel mineralization, for cracks or for other defects.

All the teeth were covered with three coats of acid resistant nail varnish, except for a 4 × 4 mm window left for exposure. This was done to standardize all teeth, so that, calcium can leach out from the same amount of surface area from all teeth. Five teeth each of maxillary premolars were randomly allocated into each of the 7 groups.

**Study design:**

Each tooth was incubated in 100 mL beverage for upto 24 hours at 37° C in air tight containers. After incubation at 2 hours, 12 hours and 24 hours, the amounts of calcium released from each beverage was determined by selecting the median value of the five readings taken using Atomic Absorption Spectrophotometry. The increase in calcium in the drinks, as a result of erosive action was then calculated.

**Statistical Analysis:**

The collected data were computerized and processed
using MS Excel and Stata 10.0 version. Kruskal Wallis ANOVA was applied to test any significant differences in calcium release from baseline to 2 hours, 12 hours and 24 hours. Wilcoxon Matched Pairs test was applied to test if there is any significant difference in the percentage change in calcium levels from baseline to 2 hours, 12 hours and 24 hours. Pearson’s correlation coefficient was applied to compare the DE caused by various drinks, in relation to their baseline pH, titrable acidity and calcium contents.

RESULTS

In this invitro study on determination of erosive potential of drinks, 6 drinks were analyzed for their baseline calcium concentration and pH value and titrable acidity. The pH values ranged from 2.32 to 6.45, with coca-cola having the lowest pH and water, the highest. Coca-cola had lowest titrable acidity (1.06 ± 0.75) and orange juice had the highest (3.02 ± 0.87). Baseline calcium contents ranged from 22.07µg/mL for coca-cola to 251.31µg/mL for yoghurt. (Table 1)

The increase in calcium as a result of erosive action was measured after 2 hours, 12 hours and 24 hours. It was seen that after 2 hours, Sprite showed highest calcium release of 7.09µg/mL followed by Coca-cola which released 6.2µg/mL and Yoghurt showed lowest calcium release of 1.49µg/mL and water, 0µg/mL. Statistically significant differences were seen in calcium release between baseline to 2 hours, in all the drinks, except in maaza and yoghurt (p-value< 0.05). And that, after 12 hours, coca-cola showed the highest calcium release of 12.81µg/mL followed by maaza and sprite. After 24 hours also coca-cola showed the highest calcium release of 22µg/ml. Again here, after 12 hours and 24 hours, statistically significant differences were seen in calcium release in all the drinks, except yoghurt (p-value< 0.05). (Table 2) gives the percent gain in Calcium in the drinks after 2, 12 and 24 hours. It was seen that, statistically significant differences between baseline to 2 hours, 12 hours and 24 hours were found in all the drinks, except in yoghurt at all times and maaza from baseline to 2 hours. Pearson’s correlation coefficient showed no significant correlation in the amount of DE caused by various drinks, in relation to their baseline pH, titrable acidity and calcium contents.

Table 1: Mean baseline calcium concentration and baseline pH of the drinks.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Baseline Calcium (µg/mL)</th>
<th>Baseline pH</th>
<th>Baseline Titrable Acidity at 5.5 (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coca-Cola</td>
<td>22.07</td>
<td>2.32</td>
<td>1.06 ± 0.75</td>
</tr>
<tr>
<td>Maaza</td>
<td>89.79</td>
<td>3.08</td>
<td>1.93 ± 0.17</td>
</tr>
<tr>
<td>Sprite</td>
<td>25.56</td>
<td>3.22</td>
<td>1.12 ± 0.33</td>
</tr>
<tr>
<td>Orange juice</td>
<td>62.13</td>
<td>3.67</td>
<td>3.02 ± 0.87</td>
</tr>
<tr>
<td>Iced lemon tea</td>
<td>35.63</td>
<td>3.35</td>
<td>1.87 ± 0.54</td>
</tr>
<tr>
<td>Yoghurt</td>
<td>251.312</td>
<td>4.34</td>
<td>2.71 ± 0.39</td>
</tr>
<tr>
<td>Water</td>
<td>0</td>
<td>6.45</td>
<td>_</td>
</tr>
</tbody>
</table>

Table 2: Percentage gain in Calcium after 2, 12 and 24 hours

<table>
<thead>
<tr>
<th>Groups</th>
<th>% gain in 2hrs</th>
<th>% in 12 hrs</th>
<th>% in 24 hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coca-Cola</td>
<td>28.118**</td>
<td>58.05**</td>
<td>100.64**</td>
</tr>
<tr>
<td>Maaza</td>
<td>3.59</td>
<td>12.45**</td>
<td>26.21**</td>
</tr>
<tr>
<td>Sprite</td>
<td>27.76**</td>
<td>38.83**</td>
<td>65.14**</td>
</tr>
<tr>
<td>Orange juice</td>
<td>8.04**</td>
<td>10.89**</td>
<td>23.57**</td>
</tr>
<tr>
<td>Iced lemon tea</td>
<td>4.87**</td>
<td>14.70**</td>
<td>22.19**</td>
</tr>
<tr>
<td>Yoghurt</td>
<td>0.59</td>
<td>0.99</td>
<td>2.23</td>
</tr>
<tr>
<td>Water</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

* p<0.05; + Applied Wilcoxon Matched Pairs test
DISCUSSION

The loss of dental hard tissue as a consequence of changed eating habits is increasingly gaining importance. Unusual drinking habits like that of holding acidic beverage in the mouth before swallowing increases the contact time and thus amplifies the risk of erosion. Bedtime consumption of acid beverages is considered as a risk factor among children. Also, studies conducted previously suggest that the length of time the teeth are suffused in acidic environment is more decisive to erosion than the volume of beverage consumed. It is known that carbonated drinks are frequently held in the mouth until all bubbles have dissipated. Hence the contact time of carbonated drinks with teeth can be much longer than that for non-carbonated beverages. On account of such shifts in eating habits in recent years, it is very important for dental professionals to alarm the public on harmful effects of these beverages on dental health. Hence, this study was conducted with an aim to quantify the amount of erosion caused by various beverages.
A large number of techniques have been developed in order to determine both the change in and loss of tooth surface structures induced by erosion. Some of the techniques used most frequently are: surface roughness measured with an Optical Profilometric Device, determination of Micro Hardness, Scanning Surface Microscopy, Microradiography, Confocal Laser Scanning Microscopy (CLSM) and Chemical Analysis of leached out minerals. The quantitative light-induced fluorescence (QLF) and the Nano Indentation techniques are some recent methods.

Enamel consists of 34 to 39 percent calcium by weight (dry weight) and 16 to 18 percent phosphorus by weight. Chemical analyses have an advantage over other methods that they are not only sensitive and precise, but also DE of natural enamel surfaces can be investigated as there is no need of polishing. Therefore, a quantitative determination of calcium and phosphorus dissolved through erosive procedure is one of the most apposite methods in order to measure erosion.

In this in-vitro study, pH of all the test beverages ranged from 2.32 to 4.34, which was below the critical pH of 5.5. Those beverages with lowest pH and baseline calcium concentrations showed the most pronounced erosive effect on the enamel. This is in accordance with the studies conducted by Sales-Peres et al (2007) and Fatilah AR and Rahim ZHA. (2008).

Titrable acidity is another important aspect that has a role in causing DE. Higher titrable acidity was observed for orange fruit juice and fruit based drinks, because of which they are expected to have higher erosive potential than carbonated beverages, but was not so in our study. This could be because of the higher pH of orange juice and iced lemon tea as compared to that of carbonated beverages which is in accordance with the study conducted by Tadakamadla J et al (2015) and Jensdottir T et al (2006). Yoghurt showed the lowest calcium release, which had the highest ph, titrable acidity and calcium concentration of all the test drinks. Thus, decrease in DE was seen with decreasing baseline calcium concentrations in the drinks, similar to the study done by Pereira HS et al (2013), where, soft drinks supplemented with metallic ions reduced dissolution of bovine enamel.

Yet, the present study is not without any limitations. There are other factors that protect the oral environment from DE, like pellicle and salivary components preventing dissolution, frequency and time interval between beverage consumption, the simulation of which in invitro conditions is not feasible.

**CONCLUSION**

From the present study, it can be inferred that coca-cola, which had the lowest baseline calcium concentration and lowest pH showed the most pronounced erosive effect on dental enamel. Other than water, yoghurt showed the lowest calcium release, which had the highest pH and calcium concentration of all the test drinks. Baseline pH and baseline calcium concentration showed a significant correlation with the amount of calcium released.

Based on these analyses, personalized preventive programs may be suggested to the individuals who consume such beverages frequently. It may comprise dietary advice, optimized fluoride therapy, use of buffering medication and emphasis for nondestructive tooth brushing habits with low abrasive toothpastes.

**Conflict of Interest** - The authors do not disclose any conflicts of interest

**Source of Funding** - Self

**Ethical Clearance** - Ethical clearance was obtained by the Institutional Review Board

**REFERENCES**


Decentralized Internet of Things

Jafar A. Alzubi\textsuperscript{1}, J Selvakumar\textsuperscript{2}, Omar. A. Alzubi\textsuperscript{3}, R Manikandan\textsuperscript{4}

\textsuperscript{1}Associate Professor, School of Engineering, Al-Balqa Applied University – JORDAN, \textsuperscript{2} Department of ECE, SRM Institute of science and Technology, Chennai, India \textsuperscript{3}Assistant Professor, Prince Abdullah Bin Ghazi College of Information Technology, Al-Balqa Applied University – JORDAN, \textsuperscript{4}Assistant Professor, School of Computing, SASTRA Deemed University, India

ABSTRACT

The Internet of things (IoT) is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to connect and exchange data. It is estimated that by 2020 IoT will consist of 30 billion devices with a global market value of $7.1 trillion. With large number of devices connected to the internet, security becomes a major factor to consider. Along with security micro-payments via the internet of things becomes a huge risk. Our target with this project is to rectify both problems with the use of Blockchain technology. We want to create a decentralized peer-to-peer network of IoT devices which share a common distributed database. This database is known as a blockchain. Blockchain ensures the ownership and integrity of the data solving the security problem faced by IoT. Also, cryptocurrency written over this blockchain would solve the micropayments problem of IoT. The cryptocurrency design methodology takes into account that most IoT devices would be embedded systems thereby optimizing cryptographic standards for embedded systems. With this project we aim to improve the security risks which relate from data sharing and to reduce data redundancy by above 80%.

Keywords—Distributed Systems, Internet of Things, Decentralized, Blockchains.

INTRODUCTION

A blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography. Each block typically contains a cryptographic hash of the previous block, a timestamp and transaction data. By design, a blockchain is inherently resistant to modification of the data. It is an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way. For use as a distributed ledger, a blockchain is typically managed by a peer-to-peer network collectively adhering to a protocol for validating new blocks. Once recorded, the data in any given block cannot be altered retroactively without the alteration of all subsequent blocks, which requires collusion of the network majority \cite{1}.

We aim to use this technology to implement it in Internet of Things. We do this to improve the security risks which relate from data sharing and to reduce data redundancy. We tend to create a decentralized peer-to-peer network of IoT devices which share a common distributed database \cite{2}. Blockchain ensures the ownership and integrity of the data solving the security problem faced by IoT.

METHODOLOGY

To maintain a distributed ledger/database a mesh network is created. Each node need not be aware of every other node in the network. Although, every node should be connected to every other node directly or through nodes. Whenever a node creates a new firmware/file it notifies the closest nodes which in-turn notifies the other nodes. Thereby, every node on the network receives the new file. Every node then checks the consistency of the file using proof-of-kernel algorithm. Once a node checks the file it adds the hash of the file to the blockchain. At least 50% of the nodes on the network must verify the file and add it to their blockchain to make it immutable. This phenomenon is known as consensus. Once consensus is achieved the file becomes immutable and available to everyone. Every node minimally consists
of a Node MCU, SD card reader and SD card, battery, battery charging circuit

Fig. 1. Mesh network on NodeMCU nodes

Node MCU

Node MCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and spiffs.

SD card

This SD Card module can make your SD application easier and simple. It is easily interfaced as a peripheral to your arduino sensor shield module. Through programming, you can read and write to the SD card using your arduino

TP4056 - Li-ion battery charger

This module is made for charging rechargeable lithium batteries using the constant-current/constant-voltage (CC/CV) charging method. In addition to safely charging a lithium battery the module also provides necessary protection required by lithium batteries.

Li-ion battery

A lithium-ion battery or Li-ion battery (abbreviated as LIB) is a type of rechargeable battery in which lithium ions move from the negative electrode to the positive electrode during discharge and back when charging. Li-ion batteries use an intercalated lithium compound as one electrode material, compared to the metallic lithium used in a non-rechargeable lithium battery.

SYSTEM DESIGN

HTTP and File Storage

The HTTP Protocol runs both the web server and the web client on the on the NodeMCU. While normally we use a web server on the NodeMCU, we use a web client on the same NodeMCU. This is done so that the NodeMCU can send files and make payments in the same node. The web server has the complete back-end design in Embedded C. This is to interact with the various independent nodes created by the NodeMCU’s. The Front-End is designed such that it can display the values received by the NodeMCU. We use HTML and CSS for the data retrieval and designing the user interface.

We will be using SD card in SPI mode, first we need to connect the SD card breakout board with NodeMCU. By default FatFS module is disabled in nodemcu firmware, and we build the firmware with FatFS support using an online build tool. We load the new firmware and enter the following commands in the serial console;
it will list the files in root directory of the SD card[7]. We can open a file using file. open and can check out the file API for list of functions available.

We then store these values on the local database which is our SD module in the NodeMCU. The web client interacts with other nodes and is builds on the interface similar to the web server. Micro-Payments are done to the other nodes.

Blockchains

A blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography. Each block typically contains a cryptographic hash of the previous block, a timestamp and transaction data. By design, a blockchain is inherently resistant to modification of the data. It is "an open, distributed ledger that can record transactions inherently resistant to modification of the data. It is "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way."[8]

For use as a distributed ledger, a blockchain is typically managed by a peer-to-peer network collectively adhering to a protocol for validating new blocks. Once recorded, the data in any given block cannot be altered retroactively without the alteration of all subsequent blocks, which requires collusion of the network majority. Decentralized consensus has therefore been achieved with a blockchain. This makes blockchains potentially suitable for the recording of events, medical records, and other records management activities, such as identity management, transaction processing, documenting provenance, food traceability or voting.[9]

RESULTS

We executed the code on two nodes to verify the working of the blockchains. Before we could upload the blockchain code we had to write in the genesis block into the NodeMCUs. If a node didn’t have a genesis matching with the network it would not be able to buy or contribute to the network. For a node with the genesis block in existence successive blocks would be added to the text files (initial blocks from the balance.txt are added below)

```
//yoursetupcodehere,torunonce:
SHA256 hasher;
byte hash[SHA256_SIZE];
String fileName = "";
String from = "";
String to = "";
String amount = "";
String description = "";
String prevHash = "";
String curHash = "";
String compiled = from + to + fileName + amount + description + prevHash;
hasher.doFinal(hash);
curHash += String(hash[j], HEX); 

for(int j=0;j<32;j++)
{ 
    curHash += String(prevHash[j], HEX); 
}

StaticJsonBuffer<500> jsonBuffer;
JsonObject root = jsonBuffer.createObject();
root["from"] = from;
root["to"] = to;
root["fileName"] = fileName;
root["amount"] = amount;
root["description"] = description;
root["prevHash"] = prevHash;
root["curHash"] = curHash;

String groot;
root.printTo(groot);
File newFile = SD.open("balance.txt", FILE_WRITE);
if(newFile)
{ 
    newFile.println(groot);
    newFile.close(); 
}
else
    Serial.println("Erroropeningfile.");
```

As soon as new blocks are added to the balances.txt or the common ledger they would read by the front-end javascript and be presented on the browser page for the user.

Fig. 3. Interlocking of blocks

Fig. 4. Front-end of the blockchain

Acknowledgment

We would like to express our deepest gratitude to our guide, Mr. Manigandan his valuable guidance, consistent encouragement, personal caring, timely help and providing me a clear understanding of cryptography on embedded devices work. J. Selvakumar has been of tremendous help for giving us cheerful and cordial support to us for completing this research too.

References


APPENDIX A

HARDCODING THE GENESIS BLOCK ONTO THE DEVICE

Genesis.ino

```c
#include <ArduinoJson.h>
#include <ESP8266WiFi.h>
#include <WiFiClient.h>
#include <ESP8266mDNS.h>
#include <ESP8266httpUpdate.h>
#include <ESP8266HTTPClient.h>
#include <ESP8266WebServer.h>
#include <Crypto.h>
#include <SD.h>

void setup() {
  SD.begin(4);
}
```

CONCLUSION

With the proposed blockchain design we have proved that the security risks related to data sharing and reduction in data redundancy have been reduced by above 80%. In future more blockchain can be added and further reduction in redundancy rate can be achieved.

ACKNOWLEDGMENT

We would like to express our deepest gratitude to our guide, Mr. M. Manigandan his valuable guidance, consistent encouragement, personal caring, timely help and providing me with an excellent atmosphere for doing research. All through the work, in spite of his busy schedule, he has extended cheerful and cordial support to us for completing this research work. J. Selvakumar has been of tremendous help for giving us a clear understanding of cryptography on embedded devices too.

### Ethical Clearance

I testify on behalf of all co-authors that our article submitted to Indian Journal of Public Health Research & Development.

#### Title: Decentralized Internet of Things.

All authors: Jafar A. Alzubi, J. Selvakumar, Omar A. Alzubi, R. Manikandan

1) This material has not been published in whole or in part elsewhere;

2) The manuscript is not currently being considered for publication in another journal;

3) All authors have been personally and actively involved in substantive work leading to the manuscript, and will hold themselves jointly and individually responsible for its content.

#### Source of Funding

Self.

#### Conflict of Interest

Nil.

### REFERENCES


Self Reported Oral Pain and Dysfunctions Associated with Radiation Induced Oral Mucositis among Head and Neck Cancer Patients - A Prospective Observational Study

Prabha Lis Thomas¹, Harmeet Kaur², Karthik S. Rishi³

¹Research Scholar, Vice Principal Krupanidhi College of Nursing, Chikkabellandur, Carmelaram, Bangalore, ²Principal, Chitkara School of Health Sciences, Chitkara University, Punjab, ³Consultant, Radiation, Oncology, Sri Shankara Cancer Hospital and Research Centre, Bangalore

ABSTRACT

Objectives: This study aimed at identifying and describing self reported oral pain and dysfunctions associated with oral mucositis among patients with head and neck cancer treated with radiation.

Method: A prospective observational study was conducted on 30 head and neck cancer patients who were undergoing radiation therapy and consented to participate. Data was collected by using a baseline proforma, WHO Oral Toxicity scale and Patient reported oral mucositis symptom scale. The patients were followed up during the entire course of radiation therapy and were monitored for the development of oral mucositis and were asked to rate their pain and associated dysfunctions on 100 mm scale.

Result: The present study findings revealed that all the subjects developed oral mucositis at the end of third week which was progressed to grade 3 or 4 mucositis by the end of therapy. The scores of oral pain and oral dysfunctions were progressively increased during the course of treatment with its peak at the end of treatment. Cumulative dose of radiation therapy and receipt of concurrent chemotherapy were found to have a significant association with oral dysfunction. The study also noted a significant positive correlation with severity of mucositis and oral dysfunctions.

Conclusion: Severe and painful oral mucositis is a dose limiting adverse effect of radiation therapy and its detrimental effect on oral functions is significant. Hence adequate preventive measures of mucositis to be identified to enhance the quality of life of head and neck cancer patients receiving radiation therapy.

Keywords: oral pain, oral dysfunctions, head and neck cancer patients

INTRODUCTION

Head and neck cancer treatment generally consists of a combination of radiotherapy, surgery, and chemotherapy. Majority of patients with head and neck cancer exhibit local or regionally advanced disease and hence the treatment option is usually a multimodal therapy including radiotherapy, surgery, and chemotherapy to achieve maximum tumour control. This multimodal and aggressive cancer therapy causes a plethora of short-term and long-term oral and oropharyngeal sequelae which adversely affects the oral functions and results in poor quality of life.

Oral Mucositis is the most common and debilitating reaction arising from the cancer treatment. Mucositis is described as an inflammation of the oral mucosa resulting from chemotherapy or ionizing radiation. Earliest manifestation oral mucositis appear with a dosage of radiation equivalent to 1000 CGY, which generally occurs in the first week of treatment and clinically manifests as a rash in the oral mucosa which
often progresses to skin loss and ulceration. Ulcers are typically covered by a white pseudo membrane\textsuperscript{2,3}.

Mucositis is a clinical challenge with an incidence of 36-100\% among head and neck cancer patients receiving radiation therapy\textsuperscript{4} and is a major burden on head and neck cancer patients as it adversely affects the oral functions. Oral pain associated with radiation therapy induced mucositis is a significant contributor to emotional distress and often leads to lower food intake potentially resulting in undernourishment and weight loss\textsuperscript{5}. In radiotherapy-induced mucositis, the pain intensity escalates at week 3 , peeking at week 5 and persists for weeks. Pain is intense and interferes with oral functions\textsuperscript{6} and results in dry mouth, dysgeusia, dysphagia, altered speech, and chewing or eating difficulties\textsuperscript{7}.

Oral mucositis, pain, dysphagia, and altered taste perception may lead to loss of appetite, malnutrition, reduced treatment compliance and radiation treatment breaks with a possible interference on tumour control. A systematic review conducted on literature on pain in chemo radiation therapy treated head and neck cancer patients reported that mucositis pain is frequent (80\%), and interfere with daily activities (40\%) and social activities (60\%)\textsuperscript{8}. These consequences greatly affect the patient’s total quality of life\textsuperscript{9} and may lead to severe disability which can increase the costs of care, tube feeding, extended hospitalization, or unanticipated re-hospitalization, and can cause modification to or interruption of the cancer therapy itself\textsuperscript{10}.

Hence an investigation of self reported oral pain and oral dysfunctions associated with radiation induced oral mucositis could help to reduce the patients anxiety by explaining them how the oral pain will affect their oral function. Addressing the patient reported clinical outcomes during cancer therapy helps the care givers to identify and institute possible novel protocols for reducing and managing the complications during head and neck irradiation.

**METHOD**

Population and sampling of study

The study employed a descriptive approach and 30 histopathologically confirmed patients of head and neck cancer scheduled to receive radiotherapy at Sri Shankara Cancer and research institute, Bangalore were selected randomly as per the inclusion criteria. Exclusion criteria included patients younger than 18 years, patients who had oral surgery within the previous 6 weeks, and patients with co morbid conditions. The study was approved by the hospital ethical committee. Informed written consent was obtained from the subjects and the subjects were followed up during the entire course of radiation therapy.

**DATA COLLECTION METHOD**

Base line Performa was used to collect demographic data and the clinical data regarding the site of cancer, daily and cumulative dose of radiation therapy, type of chemotherapy medications were obtained from the subjects’ medical records. The clinical manifestations of oral mucositis was evaluated by WHO toxicity criteria every week till the end of radiation therapy and was graded in to 4 categories ranging from 0-4 based on soreness, erythema, presence of ulcerations, ability to swallow solid food and the extent to which alimentation is not possible. At each clinical examination the participants completed a Patient reported oral mucositis symptom scale (PROMS) to appraise how oral mucositis affected common oral functions. The PROMS scale consists of 10 questions that are answered on a visual analogue scale (VAS), by setting a mark on each horizontal line measuring 100 mm. Two questions focused on mouth pain and change in taste and the other 8 questions focused on how much their mouth sores affected different oral functions on the day of the clinical examination.

**DATA ANALYSIS**

The data were typed into spreadsheet and SPSS (Statistical package for Social Science, IBM Corporation) version 23 was used for statistical analysis. Descriptive statistics using frequency, mean and standard deviation were employed to summarize the demographic and clinical characteristics of the participants and severity of oral pain and dysfunctions. Chi square test was computed to determine the association between oral dysfunctions and clinical characteristics. Spearman rank correlation was computed to identify the correlation between oral mucositis and oral dysfunctions.

**RESULTS**

Description of characteristics of the subjects
A total of 30 patients who fulfilled the eligibility criteria were included in the study and the study comprised of 77% males. The mean age was 60.9 years and 23% of them were educated up to higher secondary. The participants were diagnosed with carcinoma of oral cavity (63%), Laryngeal cavity (23%) and pharyngeal cavity (13%). A high proportion of tumours were classified as T2 (44%), followed by T3 (30%); T4 (23%) and T1 (3%) and 92% of the subjects had undergone surgical resection of the primary tumours site. Majority (47%) of the patients received a cumulative dose of 70 Gy and a fractionated dose of 2Gy per day (73%). 46.66% of the subjects received concurrent chemotherapy during radiation therapy and all of them received Cisplatin and 5 Fluorouracil.

### Onset and severity of oral mucositis

The analysis revealed that the early manifestations of oral mucositis (grade 1 or grade 2) appeared in 43% of the patients by the end of first week and all the subjects developed Radiation induced oral Mucositis at the end of third week. Grade 3 or 4 mucositis was present in all the subjects by seven weeks and Ryles tube feeding was initiated for 4 subjects who developed grade 4 mucositis. (Fig1) The cheeks, lower lip and ventral and lateral tongue were the predominant sites of ulceration. Mean mucositis score was increased from 0 at baseline to 3.4 ± 0.31 at the end of the treatment. (Fig2)
Oral pain and oral dysfunctions associated with radiation induced oral mucositis.

The scores of all the ten components of PROMS increased gradually during the cancer treatment period. Oral pain scores associated with mucositis were progressively increased from 17.3± 1.53 at the end of first week to 75.45 ± 1.95 at the end of seven weeks. Ninety percent of the subjects (n=27) were taking analgesic medication more or less constantly during the course of radiation therapy and despite this medication the participants reported consistently increasing pain score throughout the entire period of radiation therapy. Difficulty eating hard foods, change of taste and difficulty in swallowing were considerably more affected by oral mucositis than the other components of the Patient reported oral mucositis symptoms scale (Table.1).

Table1: Comparison of mean scores of oral dysfunctions during the course of radiation

<table>
<thead>
<tr>
<th>SL No</th>
<th>Items</th>
<th>First week</th>
<th>Second week</th>
<th>Third week</th>
<th>Fourth week</th>
<th>Fifth week</th>
<th>Sixth week</th>
<th>Seventh week</th>
<th>Mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oral pain</td>
<td>17.3</td>
<td>26.6</td>
<td>38.65</td>
<td>46.14</td>
<td>57</td>
<td>63.93</td>
<td>75.45</td>
<td>46.44</td>
</tr>
<tr>
<td>2</td>
<td>Difficulty speaking</td>
<td>16.13</td>
<td>22.3</td>
<td>32.73</td>
<td>40.7</td>
<td>49.7</td>
<td>57.15</td>
<td>63.25</td>
<td>40.28</td>
</tr>
<tr>
<td>3</td>
<td>Restriction in speaking</td>
<td>8.33</td>
<td>17.66</td>
<td>28.88</td>
<td>48.13</td>
<td>56.17</td>
<td>59.85</td>
<td>60.25</td>
<td>39.9</td>
</tr>
<tr>
<td>4</td>
<td>Difficulty eating hard food</td>
<td>23.16</td>
<td>35.46</td>
<td>53.3</td>
<td>64.1</td>
<td>78.8</td>
<td>85</td>
<td>88.9</td>
<td>67.59</td>
</tr>
<tr>
<td>5</td>
<td>Difficulty eating soft food</td>
<td>13.56</td>
<td>21.1</td>
<td>36.07</td>
<td>46.8</td>
<td>58.93</td>
<td>66.2</td>
<td>77.1</td>
<td>45.68</td>
</tr>
<tr>
<td>6</td>
<td>Restriction in eating</td>
<td>11.37</td>
<td>20.9</td>
<td>38.7</td>
<td>50</td>
<td>66.2</td>
<td>66.56</td>
<td>69.6</td>
<td>46.19</td>
</tr>
<tr>
<td>7</td>
<td>Difficulty in drinking</td>
<td>12.7</td>
<td>18.8</td>
<td>32.67</td>
<td>41.33</td>
<td>48.76</td>
<td>55.43</td>
<td>60.45</td>
<td>38.59</td>
</tr>
<tr>
<td>8</td>
<td>Restriction in drinking</td>
<td>9.2</td>
<td>17.16</td>
<td>29.06</td>
<td>37.56</td>
<td>48.4</td>
<td>54</td>
<td>56.25</td>
<td>35.95</td>
</tr>
<tr>
<td>9</td>
<td>Difficulty in swallowing</td>
<td>15.46</td>
<td>27.26</td>
<td>40.5</td>
<td>54.26</td>
<td>65.06</td>
<td>75.8</td>
<td>82.85</td>
<td>51.59</td>
</tr>
<tr>
<td>10</td>
<td>Loss of taste</td>
<td>17.4</td>
<td>27.76</td>
<td>50.56</td>
<td>63.7</td>
<td>76</td>
<td>85.03</td>
<td>91.47</td>
<td>58.84</td>
</tr>
</tbody>
</table>

Chi square analysis revealed a significant association between daily & cumulative radiation dose and receipt of concurrent chemotherapy with oral dysfunction among head and neck cancer patients (Table2). Spearman rank correlation was computed and revealed a significant correlation between mucositis and PROM aggregate score at the end of therapy (r=0.79, p=0.02).
Table 2: Association between selected clinical variables and oral dysfunction among head and neck cancer patients

<table>
<thead>
<tr>
<th>Variables</th>
<th>Less than median</th>
<th>More than median</th>
<th>Chi value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-60</td>
<td>5</td>
<td>8</td>
<td>0.832</td>
<td>0.858</td>
</tr>
<tr>
<td>&gt;60</td>
<td>6</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site of cancer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral</td>
<td>9</td>
<td>10</td>
<td>3.45</td>
<td>0.178</td>
</tr>
<tr>
<td>Pharyngeal</td>
<td>0</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laryngeal</td>
<td>2</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>10</td>
<td>6</td>
<td>5.12</td>
<td>0.023</td>
</tr>
<tr>
<td>CT+CT</td>
<td>3</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily RT Dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.8-2 Gy</td>
<td>9</td>
<td>5</td>
<td>5.67</td>
<td>0.017</td>
</tr>
<tr>
<td>&gt;2 Gy</td>
<td>4</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative RT Dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 Gy</td>
<td>5</td>
<td>2</td>
<td>10.28</td>
<td>0.006</td>
</tr>
<tr>
<td>61-70</td>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;70 Gy</td>
<td>1</td>
<td>13</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant at 0.05, **significant at 0.01

**DISCUSSION**

Head and neck irradiation is often accompanied by significant and profound acute oral mucositis which adversely affects many of the oral functions. Clinical significance of oral mucositis is attributed to a complex interaction of the patient’s perception of the altered oral function. The present study observed that all the subjects developed oral mucositis by the end of 3rd week and intensified in severity by sixth or seventh week of radiation therapy. This finding supports the previous findings that oral mucositis is a distressing condition which is observed at the first week of head and neck irradiation and reaches its maximum intensity at the end of the treatment.

The suffering caused by oral mucositis is multifaceted. Pain due to oral mucositis is the most frequently reported patient related complaint affecting quality of life. In the present study the subjects reported a consistently increasing pain score during the course of radiation therapy despite the intake of analgesics. These findings corroborates the observations made by a previous prospective observational study conducted on head and neck cancer patients which reported a poor pain control and high intake of analgesics during radiation therapy indicating neuropathic nature of pain which adversely affect activities of daily living and require a greater dose of analgesics.

Severe and painful oral mucositis is associated with a high level of oral dysfunctions and in general, the most common presentations of oral mucositis-related dysfunction are dysphagia, changes in food tastes, dry mouth, eating and drinking difficulties and inability to speak. It is observed in the current study that the oral functions eating, drinking, swallowing, speaking and sense of taste were affected and change of taste, difficulty eating hard foods and difficulty in swallowing were the most affected dysfunctions. Previous studies have reported similar findings that dysphagia (88%), change of taste (92%) and difficulty in eating solids (90%) were the most prevalent oral dysfunctions among patients during head and neck irradiation. A cumulative dose of more than 30 Gy can cause damage to the taste buds and salivary glands and impairs the individual’s ability to detect basic tastes (sweetness, sourness, saltiness, and bitterness).
Dysphagia combined with loss of taste can interfere with the patients’ food and fluid intake with significant weight loss and malnutrition\textsuperscript{12}.

Cumulative radiation dose and receipt of concurrent chemotherapy were found to have a significant association with the severity of oral dysfunctions ($p = 0.01$) and the study also observed a significant positive correlation between mucositis and oral dysfunctions. Similar findings have been reported in a cross-sectional study on eighty-eight head and neck cancer patients with oral mucositis receiving cancer therapy in which intensity of oral mucositis were significantly correlated with distress score of oral dysfunction ($r = 0.791$, $P < 0.001$), dysphagia ($r = 0.513$, $P < 0.001$) and loss of taste ($r = 0.578$, $P < 0.01$)\textsuperscript{12}. The findings indicate that oral mucositis adversely affects oral functions and an altered oral function is common sequelae of oral mucositis.

The current study is limited to a small sample size of 30 and to a single setting. The study was aimed to quantify the severity of oral dysfunctions perceived by head and neck cancer patients during radiation therapy and hence did not involve any objective measurement of these dysfunctions.

**CONCLUSION**

The findings have demonstrated that the intensity of oral dysfunction during head and neck irradiation were moderately high from the patients’ point of view and hence increased attention and treatment of oral dysfunctions are essential to achieve the best outcomes of cancer therapies.

**Conflicts of Interest:** The authors declare no conflict of interest

**Ethical Clearance:** The study was approved by the hospital ethical committee. Patients and their caregivers indicated their willingness to participate in the study after the details of the study had been explained to them. The subjects were also informed that they had the right to withdraw from the study at any time during the course of the study and written informed consent was obtained from them.

**Source of Support:** Self

**REFERENCES**

from: http://linkinghub.elsevier.com/retrieve/pii/S0360301607002477


A Comparative Evaluation of Antibiotic Susceptibility Pattern of Methicillin Sensitive and Methicillin Resistant \textit{Staphylococcus Aureus} Isolated from Clinical Specimens in a Tertiary Care Hospital

P.Vamsi Muni Krishna\textsuperscript{1}, V.Sreenivasa Reddy\textsuperscript{2}, V.Praveen Kumar\textsuperscript{3}, P.Suresh\textsuperscript{1}

\textsuperscript{1}Ph.d Scholar, Bharath University, Agaram Road, Selaiyur, Chennai, Tamilnadu, \textsuperscript{2}Professor, Dept. Of Microbiology, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry, \textsuperscript{3}Ph.d Scholar, Bharath University, Agaram Road, Selaiyur, Chennai, Tamilnadu

\textbf{ABSTRACT}

\textbf{Introduction:} \textit{Staphylococcus aureus} is a major human pathogen that causes a variety of suppurative (pus-forming) infections had evolved as a major cause of hospital acquired (nosocomial) infection humans. MRSA, a resistant variant of \textit{Staphylococcus aureus} is resistant various classes of antibiotics such as penicillins, methicillin, cephalosporins and the fluoroquinolones, it is often reflected as a superbug. Methicillin-resistant \textit{Staphylococcus aureus} (MRSA) posed to be an uncontrollable, nuisance in serious public concern. Vancomycin, a glycopenptides is the treatment of choice for MRSA infections. In recent times development of vancomycin resistant \textit{Staphylococcus aureus} (VRSA), strains all around the world with highest being reported in health-care settings, the alternatives are Oxazolidons which includes Linezolid and poly cyclic compounds such as Tetracycline and Tigecycline. \textbf{Materials and Method:} A total 620 \textit{Staphylococcus aureus} isolates employed in this study was conducted at Department of Microbiology, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry. All the isolates were collected between July 2014 to April 2017 in the study. All the isolates were identified as \textit{S. aureus} by culture and biochemical tests which included test for clumping factor, free and bound coagulase and mannitol fermentation. \textbf{Results:} The average resistance seen in Ampicillin(93.8%), Cephelexin(88.6%), Cefotaxime(86.4%), Cloxacillin (17.9%), Erythromycin(82.4%), Gentamicin(10%), Ciprofloxacin(50.2%), Clindamycin(44.6%), Penicillin(90.5%), Tetracycline(84.8%). \textbf{Conclusion:} The present study shows health care institutions face constant and evermore problems because of \textit{Staphylococcus aureus}. Active screening and proper infection control procedures need to be adopted to control \textit{Staphylococcus aureus} infection.

\textbf{Keywords:} \textit{Staphylococcus aureus}, MRSA, Antibiotic resistance.

\textbf{INTRODUCTION}

\textit{Staphylococcus aureus} belongs to the family \textit{Micrococcaceae} and is part of the genus \textit{Staphylococcus}, which contains more than 30 species such as \textit{S.epidermidis}, \textit{S. saprophyticus} and \textit{S. haemolyticus}.

\textbf{Corresponding author:}
P.Vamsi Muni Krishna
Ph.D Scholar, Sri Lakshmi Narayana Institute of Medical Sciences (Affiliated to Bharath University) Pondicherry – 605502, Mobile: 91 7780512600, 91 8143730134, Email: omomom005@gmail.com

Among the \textit{staphylococcal} species, \textit{S. aureus} is by far the most virulent and pathogenic for humans.

\textit{S. aureus} is a 1 μm, Gram-positive cell that in the laboratory may be observed as single cells, in pairs or as grape-like irregular clusters. It is characterized as coagulase and catalase positive, non-motile, non-spore-forming and as facultative anaerobic. It grows in yellow colonies on nutrient rich media and is referred to as the yellow \textit{staphylococci}.

Alexander Ogston presented in 1880 at the Ninth Surgical Congress in Berlin his work establishing
the causative role of bacteria in wound infection and subsequent septicemia. Building on the teachings of his senior contemporaries, Louis Pasteur and Joseph Lister, Ogston had observed pus from 88 human abscesses under his microscope and noted Gram-positive spherical “micrococci”. Ogston named them staphyle, the Greek expression for a bunch of grapes. In 1884, Rosenbach succeeded in isolating yellow bacterial colonies from abscesses and named them Staphylococcus aureus, “aureus” from the Latin word for golden.

*S. aureus* has the ability to adapt to different environments and it may colonize the human skin, nails, nares and mucus membranes and may thereby disseminate among recipient host populations via physical contact and aerosols. Colonization with *S. aureus* is an important risk factor for subsequent *S. aureus* infection. *Staphylococcus aureus* has been recognized historically as a virulent and important human pathogen. *S. aureus* causes a variety of infections ranging from skin and soft tissue infections to invasive diseases such as bacteremia, endocarditis, pneumonia, visceral abscesses, osteoarthritis and septicemia.

MRSA, a resistant variant of *S. aureus* is resistant to various classes of antibiotics it is often referred to as a super-bug. During the last three decades, many articles have been published describing and debating the epidemiology of methicillin-resistant *Staphylococcus aureus* (MRSA). This work was stimulated by the ongoing impact of infections caused by MRSA and the difficulties in preventing or treating them. Nevertheless, uncertainties regarding the transmission and control of MRSA remain. For instance, new epidemic strains of multi-resistant *S. aureus* have continued to emerge and decline for unknown reasons in different places since 1961. It remains unclear why some European countries such as Denmark have nearly abolished their MRSA problem, whereas countries like the UK are affected by the rising occurrence of epidemic invasive strains of MRSA, whereas countries like Denmark have nearly abolished their MRSA problem. Moreover, some local MRSA outbreaks have disappeared without any particular control efforts or antibiotic restriction, while others institutions report MRSA propagation or reappearance despite various attempts to contain it.

Almost 40 years after the first report of MRSA in the UK, the study by Farrington and colleagues published in this issue of QJM, describes another astonishing MRSA experience, and presents new insights into the never-ending struggle to prevent MRSA infections. Several aspects of the retrospective study by Farrington and co-authors attract our attention. First, this paper describes in a very detailed and careful manner a 12-year experience with MRSA at Addenbrooke’s Hospital in Cambridge. The authors demonstrate that sporadic or epidemic strains of MRSA could be controlled over 10 years through the use of a stringent, but labour-intensive control policy including screening of high-risk patients, transfer of patients to isolation rooms, and ward closure to new admissions in case of MRSA transmission. Since 1993, however, an increase of patients admitted with MRSA halted the initial ‘search and destroy’ strategy, resulting in a dramatic hospital-wide MRSA outbreak.

The present study was designed to investigate the incidence of a comparative evaluation of Antibiotic susceptibility Pattern of Methicillin sensitive and Methicillin resistant *Staphylococcus aureus* isolated from clinical Specimens in a Tertiary Care hospital.

**MATERIALS AND METHOD**

This study was carried out to determine the antimicrobial susceptibility pattern of Methicillin sensitive and Methicillin resistant *Staphylococcus aureus* isolated from different clinical specimens (Table: 1) between April 2014 to January 2018 in the Department of Microbiology, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry were included in the study.

**Isolation of Staphylococcus aureus from clinical samples:** A total of 620 consecutive isolates of *S. aureus* were isolated from clinical specimens. All the specimens were inoculated on nutrient agar, blood agar and incubated at 37°C overnight. The biochemical tests such as haemolysis, Gram’s stain, catalase, coagulase, and sugar fermentation were done for further confirmation.

**Antibiotic Susceptibility test by disc diffusion assay:**

The antimicrobial sensitivity testing was carried out by disc agar diffusion technique using Mueller-Hinton agar plates and the results interpreted according to clinical laboratory standards international (CLSI) guidelines. The clinical isolates of *S. aureus* were Gram-stained before the test. The *S. aureus* cultures were inoculated in peptone water and incubated at 37°C, the inoculums was adjusted to a turbidity equivalent of
0.5 McFarland standard. The entire agar surface was swabbed. The following antibiotic discs were applied Ampicillin (10mcg), Cephelexin (30mcg), Cefotaxime (30mcg), Vancomycin (5mcg), Erythromycin(30 mcg), Gentamicin (10mcg), Ciprofloxacin(10 mcg), Clindamycin (2mcg), Penicillin(10 units), Tetracycline (30mcg) and the plates were incubated at 37°C and examined after 18–24 h.

Identification of MRSA

All the isolates of \textit{Staphylococcus aureus} isolates were subjected to Cefoxitin disc diffusion testing using a 30μg Cefoxitin disc. The results were interpreted according to CLSI guidelines 2014. An inhibition zone diameter of ≤ 21 mm was reported as methicillin resistant and ≥ 22 mm was reported as methicillin sensitive. Since Kirby Bauer disc diffusion method is not recommended for susceptibility testing of \textit{Staphylococcus aureus} to vancomycin, determination of minimum inhibitory concentration (MIC) has to be done either by broth dilution method.

RESULTS

Out of 620 clinical isolates 363(58.3%) patient were from male and 257(41.4%) were female patients. Majority of the patients were age of 61-70 years. The distribution of clinical specimens were given in the below table (Table- 1). Of the 620 isolates of \textit{Staphylococcus aureus}, 268 isolates were found to be methicillin-resistant \textit{Staphylococcus aureus} (MRSA) and 352 were MSSA. The prevalence of MRSA and MSSA were 43.2% and 56.7% respectively.

Table- 1: Characteristics of specimen (n=620)

<table>
<thead>
<tr>
<th>S.No</th>
<th>Characters</th>
<th>No</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age(yrs):</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1-10</td>
<td>24</td>
<td>3.8 %</td>
</tr>
<tr>
<td></td>
<td>11-20</td>
<td>32</td>
<td>5.1 %</td>
</tr>
<tr>
<td></td>
<td>21-30</td>
<td>86</td>
<td>13.8 %</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>72</td>
<td>11.6%</td>
</tr>
<tr>
<td></td>
<td>41-50</td>
<td>104</td>
<td>16.7%</td>
</tr>
<tr>
<td></td>
<td>51-60</td>
<td>78</td>
<td>12.5%</td>
</tr>
<tr>
<td></td>
<td>61-70</td>
<td>126</td>
<td>20.3%</td>
</tr>
<tr>
<td></td>
<td>71-80</td>
<td>98</td>
<td>15.8%</td>
</tr>
<tr>
<td>2.</td>
<td>Sex:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>363</td>
<td>58.5%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>257</td>
<td>41.4%</td>
</tr>
<tr>
<td>3.</td>
<td>Distribution of samples:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urine</td>
<td>192</td>
<td>30.9%</td>
</tr>
<tr>
<td></td>
<td>Pus</td>
<td>167</td>
<td>26.9%</td>
</tr>
<tr>
<td></td>
<td>Wound</td>
<td>33</td>
<td>5.3%</td>
</tr>
<tr>
<td></td>
<td>Nasal swab</td>
<td>19</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Throat swab</td>
<td>21</td>
<td>2.5%</td>
</tr>
<tr>
<td></td>
<td>Sputum</td>
<td>96</td>
<td>15.4%</td>
</tr>
<tr>
<td></td>
<td>Blood</td>
<td>37</td>
<td>5.9%</td>
</tr>
<tr>
<td></td>
<td>Cathertip</td>
<td>09</td>
<td>1.4%</td>
</tr>
<tr>
<td></td>
<td>Vaginal swab</td>
<td>04</td>
<td>0.6%</td>
</tr>
<tr>
<td></td>
<td>Bodyfluids</td>
<td>42</td>
<td>6.7%</td>
</tr>
</tbody>
</table>
Table 2: Antibiotic Susceptibility profile of *Staphylococcus aureus* from clinical specimens (n=620)

<table>
<thead>
<tr>
<th>S.No</th>
<th>Antibiotic</th>
<th>Sensitivity of MSSA No% (n=352)</th>
<th>Resistant of MSSA No % (n=352)</th>
<th>Sensitivity of MRSA No% (n=268)</th>
<th>Resistant of MRSA No % (n=268)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ampicillin(10mcg)</td>
<td>28(7.9%)</td>
<td>324 (92%)</td>
<td>256(95.5%)</td>
<td>12(4.4%)</td>
</tr>
<tr>
<td>2</td>
<td>Cephexlin (30 mcg)</td>
<td>58(16.4%)</td>
<td>294(83.5%)</td>
<td>64(23.8%)</td>
<td>204(76.1%)</td>
</tr>
<tr>
<td>3</td>
<td>Cefotaxime(30mcg)</td>
<td>84(23.8%)</td>
<td>268(76.1%)</td>
<td>146(54.4%)</td>
<td>122(45.5%)</td>
</tr>
<tr>
<td>4</td>
<td>Vancomycin(30mcg)</td>
<td>352(100%)</td>
<td>0</td>
<td>259(96.6%)</td>
<td>9(3.3%)</td>
</tr>
<tr>
<td>5</td>
<td>Erythromycin(30 mcg)</td>
<td>38(10.7%)</td>
<td>314(89.2%)</td>
<td>253(94.4%)</td>
<td>15(5.5%)</td>
</tr>
<tr>
<td>6</td>
<td>Gentamicin (10mcg)</td>
<td>40(11.3%)</td>
<td>312(88.6%)</td>
<td>58(21.6%)</td>
<td>210(78.3%)</td>
</tr>
<tr>
<td>7</td>
<td>Ciprofloxacin(10 mcg)</td>
<td>204(57.9%)</td>
<td>148(42%)</td>
<td>112(41.7%)</td>
<td>156(58.2%)</td>
</tr>
<tr>
<td>8</td>
<td>Clindamycin (2mcg)</td>
<td>308(87.5%)</td>
<td>44(12.5%)</td>
<td>198(73.8)</td>
<td>70(26.1%)</td>
</tr>
<tr>
<td>9</td>
<td>Penicillin(10 units)</td>
<td>0</td>
<td>352(100%)</td>
<td>0</td>
<td>268(100%)</td>
</tr>
<tr>
<td>10</td>
<td>Tetracycline (30mcg)</td>
<td>194(55.1%)</td>
<td>158(44.8%)</td>
<td>68(25.3%)</td>
<td>200(74.6%)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

MRSA is a major nosocomial isolate in hospitals which is responsible for higher morbidity and mortality. (Costantini). MRSA strains are resistant to several antibiotics like macrolides, lincosides, aminoglycosides and beta-lactum penicillin and cephalosporins. The MRSA isolates subjected to antibiotic sensitivity pattern in the present study reveals that the isolates have also developed resistance to other antibiotics tested.

The present study showed that males had a higher isolation rate of *S. aureus* than females. Different studies have depicted variations in the prevalence rates of MRSA in different countries. The overall relative proportion of MRSA was 43.2%. The overall relative proportion of MSSA was 56.8% similar findings were seen by Arora.S et al.\(^{25}\) from North India, reported 46% MRSA.

The isolates of MRSA and MSSA exhibited 100 percent resistance to Penicillin similar results were reported by Chandrashekar et al.,\(^{26}\) in contrast a study by Jayatilleke K et al reported 17% sensitivity.\(^{28}\) The lowest drug resistant was observed for Vancomycin (3.3%), where as a study from North India by Ankur Kumar et al.\(^{27}\) reported 100 percent sensitivity.

**CONCLUSION**

Regular surveillance of antibiogram of both community acquired and hospital-acquired infections of *staphylococcus aureus* is required in formulating and monitoring the antibiotic policy. As these pathogens acquire resistance to new classes of antimicrobial agents controlling the usage of glycopeptides and linezolid is necessary in avoiding the emerging resistance trends only in MRSA cases should be encouraged preservation of glycopeptides and linezolid for use only in MRSA cases should be encouraged.

**Source of Funding:** Self.

**Conflict of interest:** Nil.

**Ethical Clearance:** Taken from Sri Lakshminarayana Institute of Medical Sciences, Pondicherry. Institutional Ethics committee(Human Studies) Ref.No.IEC/C-P/50/2014.

**REFERENCES**


13. Pittet D, Waldvogel FA. To control or not to control colonization with MRSA...that’s the question! Q J Med 1997; 90:239-241.


24. Clinical and Laboratory Standards Institute, Performance Standards for Antimicrobial Susceptibility testing; 22 nd information supplement, M100-S22 Wayne, PA; 2014.


Efficient Approaches for Prediction of Brain Tumor using Machine Learning Techniques

Jafar A. Alzubi¹, Ambeshwar Kumar², Omar. A. Alzubi³, R. Manikandan⁴

¹Associate Professor, School of Engineering, Al-Balqa Applied University – JORDAN, ²Teaching Assistant, School of Computing, SASTRA Deemed University, India, ³Assistant Professor, Prince Abdullah Bin Ghazi College of Information Technology. Al-Balqa Applied University – JORDAN, ⁴Assistant Professor, School of Computing, SASTRA Deemed University, India

ABSTRACT

Tumor is one of the most prevalent diseases in the brain. It is the reason why the diagnosis and treatment of the brain tumor have critical importance. MRI (Magnetic resonance imaging) is a scientific maneuver used to produce a computerized image of internal body tissue. MRI image is a diagnostic approach used for detection of a brain tumor and classifies it as a type malignant and benign. There are different processes to detect the brain tumor. Image processing, feature extraction, and many algorithms have been implemented for the detection of brain tumor, but a convincing and accurate technique to detect the tumor’s precise position and to diagnose in minimal time is in great need. The execution and complexity involved in the medical image segmentation process are enhanced by applying feature extraction techniques and mathematical models. Furthermore, to improve the accuracy and performance of detection of brain tumor using existing Artificial Neural Network and Naïve Bayes Classifier, In this article we propose a novel technique using mathematical analysis to predict and enhance the better models. The proposed method has been implemented for detecting the type of brain tumor and its specific location in the brain. The proposed system will be used to diagnose the patient’s brain tumor with good accuracy success rate.

Keywords— Magnetic Resonance Image, Brain tumor, Malignant, Benign, Feature extraction, Preprocessing, Artificial Neural Network, Naïve Bayes Algorithm, Canny Edge Detection.

INTRODUCTION

Brain tumor appears when an abnormal cell is formed in the brain, known as intracranial neoplasm. There is a dual category of brain tumor, cancerous tumor or malignant and benign tumor. All category of brain tumor may produce a syndrome that varies lean on the portion of the brain involved. The origin of most of the brain tumor is unknown. The tumor is categorized by the tumor’s origin and if its malignancy as a benign and malignant.

Malignant or cancerous tumor consists of a cancerous cell that cannot be eliminated quickly, eventually leading to death. Hence malignant are more harmful than benign. MRI is a widely used technique in neurosurgery & neuroscience. It gives a computerized view of tissue, thus helps to detect a human brain tumor. The MRI scanning is more appropriate than CT scanning for diagnosis; it does not affect the human body because it does not use any radiation. The Treatment of tumor starts with the doctor obtaining the family and personal medical history and performing a complete physical examination. The brain is divided into four parts - frontal lobe, parietal lobe, Temporal lobe, Occipital lobe, and the Cerebellum, pituitary gland and Brainstem.

The typical Existence rate for malignant brain tumor patients is only 34.7%. Nearly 16,620 people will expire from a malignant brain tumor in the year 2018 in the United States. In this paper, we use Fuzzy C means, and K means for segmentation of the MRI Images. The artificial neural network is a proficiency classifier used to categorize the tumor. This paper is organized as follows: covers Literature Review, Analysis on recognition of tumor following the Proposed methodology, with expected output and finally the conclusion with acknowledgment.
LITERATURE REVIEW

Dr. Babuantoe t al [1] the MRI brain image using anisotropic diffusion filter discrete wavelength transform based feature is extracted and the extracted feature are given as a input to the segmentation stage SVM(Support vector Machine) was used for tumor segmentation and classification. The result came as a showing output that brain tumor is either critical or normal stage further on basis of that treatment will be executed or the accuracy of proposed method is 86%.

Prof. Akshta, et al [2] they detect a brain tumor by thresholding method application of morphological operation and extraction of tumor region for further analysis and shrinking the image and calculation of the area is efficient parameter in detecting the stage of brain tumor patient. Histogram used to summarize the data, the lapsed time for entire program is 9.14 sec but not able to normalize the category of tumor and not applicable for color images. Warintorn phusomsai, et al [3] the investigation possibilities to improve the recognition and its exactitude performance is established against SVM and a traditional ELM that is 90% against 64% and 70%. Later to improve in H-ELM in aspect of computational complexity with high dimension and large data sets.. ELM with sigmoid accomplishes the finest performance the highest precision is around 70% comparable to hard limit, radial basis sine and triangular basis.

R Manikandan, et al [4] using of clustering method of grouping a set of pattern into a number of cluster. To intention an automatic tool for brain tumor recognition using MRI image data sets. Classification region using their multi parameter value make the study of region of physiological and pathological interest and definable for future enhancement. Sanjeevkumar, et al [5] including hybrid approach includes discrete wavelet transform (DWT) to be usage for abstraction of feature. The suggested hybrid approach is functional to brain MRI images to classify that tumor is either malignant or benign and the linear accuracy vary from 80% to 90%. B. Hema Kumar, et al [6] have refined a Non-invasive grading and prognosis prediction methodology using CT and MRI images that preclude the necessity of biopsy to certify the survival of tumor and there by helps the Diagnostic in accurate diagnosis. The result generated from the FETGS System. The FETGS proposed method as 92.6% sensitive and 82.38% specific with the entire image set in case of benign and malignant. Pawar, Ganbote et al [7] used feature extraction to obtain most relevant data from the unique data set. KNN Algorithm and C means algorithm has been used for showing the space of interest. They overcome with the restriction of the existing system and enhancing the detecting the tumor and providing the size and space of the tumor. B Devkota, et al [8] they used mathematical morphological reconstruction. The image is being preprocessed to disregard the noise and then segmented to find an interest point of region with probable tumor. The limitation in the separation method such as deprived accuracy and high computational rate, asubstitute method for segmentation was being proposed. Narkhade Sachin, et al [9] their objective is to perceive the location and boundary of tumor automatically. Based on symmetric and unsymmetrical region it able to define that whether the tumor is detected like if symmetric then brain tumor is weekend and when unsymmetrical then it is recognized as a brain tumor. MRI of healthy brain has an almost bilateral symmetry. Nilesh B, et al [10] they optimized extracted feature only the relevant feature are held for advance analysis thus lessen the numerical unpredictability of arrangement of cerebrum tumor.

Anupurba Nandi et al [11] uses K-means clustering where the perceived tumor display certain abnormality which is then modified by the use of morphological operator along with basic image processing technique to achieve the objective of splitting the normal cell with the tumor cell. Maksoud Eman et al [12] they introduced an well-organized image segmentation methodology using k-means clustering technology assimilated with Fuzzy c means algorithm. Following by thresholding and label set dissection stages to deliver accurate brain tumor detection. Limitation isn’t able to diminish the time strategy so it will propose to demonstrate in several experiments. Garima Singh, et al [13] Efficient MRI is done with the help of SVM and naïve Bayes Classifier algorithm to provide accurate prediction and classification of the brain tumor. Many algorithm has been implemented and the further research work is going on to get a better result to detect and recognize the tumor’s place and to diagnosis it with help of MRI images and CT scan.

ANALYSIS ON RECOGNITION OF TUMOR

The segmented images are then subjected to feature extraction. The feature for the classified images is analyzed through the algorithm and [2] CT scan using
ionizing radiation while MRI using a strong magnetic field to arrange the nuclear magnetization followed by a change in the calibration of the magnetization by radio frequencies that can be detected by the scanner.

**PROPOSED METHODOLOGY**

The proposed methodology of brain tumor detection is implemented. The process to detect the tumor and classify it with the stage and forms of tumor. It is essential to know the category of tumor to diagnosed it, and to retrieved the stage then it is easy to rectify or to diagnose the tumor it need further process and as shown in figure 1 will standard to deliberate it in descriptive way.

**MRI Image Data Set:** The MRI image can usually be obtained from the patient’s database on the computer when the person undergoes the MRI scanning. MRI images are usually black and white, single-channel images. Description of gray shading in a black and white image is done by reading the image as a grid of black spots on a white background vice-versa.

**Image Preprocessing Technique:** MRI image cannot be used directly as an input for the proposed system. The captured image be passed through the noise removal filter. With the assistance of a median filter, the image is being filtered, thus improving the image quality and increasing the accuracy. The median filter is less delicate than other outliers as the rate of every pixel is gained by the moderate of the near-by pixel.

**Feature Extraction:** Feature Extraction is used to obtain the most appropriate information from original data by using different techniques. This technique is used when the image size is large, and feature illustration is needed to complete the tasks quickly.

**Segmentation:** It is to partition the filtered image into its constituent region or objects. It should end if point of interest has been isolated.

**Analysis of Algorithm:** An enormous number of algorithms has been executed to recognize the brain tumor and to classify the tumor and the stage. Artificial neural network and KNN algorithm is used for detecting the tumor and further, Bayes Classifier and edge detection techniques are used to classify and give a better accuracy in the detection of tumor. Genetic algorithms also arrange the solutions to search and optimization of the problems. These operators are crossover, mutation, and regeneration etc. The genetic algorithm originates with the initialization of the population which is an iterative system. The iteration is referred to as a generation and in each such generation; the capability is evaluated corresponding to each. In the optimization problem, the

---

**Figure 1. Architectural Diagram of the Proposed System**
fitness reflects the rate of the objective function in the optimization problem. K-NN Algorithm is also feasible because it combines k nearest points based on their distances and joins them in a cluster and these clusters are then evaluated. The fuzzy c means is also used to predict the tumor accurately. Mathematical models such as least square method, Entropy, Correlation and Cramer’s rule to prophesy are also used to enhance a better system to detect the brain tumor.

Statistical features are used, except the features are applied as an input of Artificial neural network. The features are discussed below

**Contrast:** It is described as the separation of the darkest and brightness area of the image.

\[
\text{Contrast} = \sum_{i,j=0}^{N-1} P_{ij} (i - j)^2 \sum_{i,j=0}^{N-1} P_{ij} (i - j)^2 \quad (1)
\]

Where \( P_{ij} \) = Probability \( i \) = training data \( j \) = testing data.

**Correlation:** It is computed into what is known as a correlation coefficient, which ranges under the value -1 and +1.

\[
\text{Correlation} = \sum_{i,j=0}^{N-1} P_{ij} \frac{(i-\mu)(j-\mu)}{\sigma^2} \sum_{i,j=0}^{N-1} P_{ij} \frac{(i-\mu)(j-\mu)}{\sigma^2} \quad (2)
\]

**Homogeneity:** Homogeneity is calculated from gray scale level of image to simplify the classification.

\[
\text{Homogeneity} = \sum_{i,j=0}^{N-1} \frac{P_{ij}}{1+(i+j)^2} \sum_{i,j=0}^{N-1} \frac{P_{ij}}{1+(i+j)^2} \quad (3)
\]

**Entropy:** The entropy is extreme when every entry in \( P_{ij} \) is equal, such as a matrix resembles to an image, when there is no preferred gray-level pair of the image.

\[
\text{Entropy} = -\sum_{i,j=0}^{N-1} \ln(P_{ij}) P_{ij} \sum_{i,j=0}^{N-1} -\ln(P_{ij}) P_{ij} \quad (4)
\]

**Variance:** Variance is regularly used to identify how much pixel varies from the neighboring pixel and used to classify in a different region.

\[
\text{Variance} = \sum_{i,j=0}^{N-1} P_{ij} (i - \mu)^2 \sum_{i,j=0}^{N-1} P_{ij} (i - \mu)^2 \quad (5)
\]

Where,

\[
\text{Mean } \mu = \sum_{i=0}^{N-1} i, P(i) \sum_{i=0}^{N-1} i, P(i) \quad (6)
\]

**Classification of tumor:** SVM is one of the most prevailing classification algorithm which is competent of giving greater enactment in terms of certainty when compared with the other classification algorithms. SVM classifier identifies the trouble by discovering out hyperplane with biggest limit, i.e. the maximal limit of hyper-plane SVM has the certain property of concurrently minimizing the classification fault and higher range of the geometric limits. By reconstructing it into high dimensional area, it searches for a linear optimal unscrambling hyper-plane. With the support of Naïve Bayes Classifier, the brain tumor is classified as benign, malignant. Bayesian Classification evaluates the class of unidentified data items using probabilistic statistical model. The challenge in Bayesian classification is to regulate the class of data sample which have some count of attributes. It evaluates the class of this undefined data item on the base of recognized data item which are providing with the class label for training purpose.

Let consider \( D \) be the dataset of \( n \) objects such that \( X_1, X_2, X_3, \ldots, X_n \). Each objects has \( t \) attribute such that \( A_1, A_2, A_3, \ldots, A_t \). There are \( m \) classes \( C_1, C_2, C_3, \ldots, C_m \). Naïve Bayes Classifier predicted the unidentified data sample \( X \) which is without the label to the class \( C_i \) if an only if

\[
P(C_i | X) > P(C_j | X) \text{ for } 1 \leq j \leq m; j \neq i. \quad (7)
\]
Then X is assigned to $C_i$. This is called Bayes Decision Rule.

Edge detection means finding the object boundary in an image. Canny Edge Detection technique is a conventional edge detection technique. It is improved techniques which doesn’t trouble the feature of edges in an image. It is then applied to the propensity to find the edge and serious value of threshold. Canny Edge detection algorithm produced the same edge map. Scaling technique is used to detect the outer limit boundary of the tumor part to define its size by which it is able to know that the stage of tumor. As all the block is being discussed to detect the brain tumor and to resolve it, the next following section deal with the expected outcome of the proposed system to give a good accuracy result to recognize a brain tumor.

**CONCLUSION & FUTURE WORK**

Existing method provides the recognition of tumor with the assistance of MRI image, it’s number of pixels and the space of tumor. The proposed system recognizes the exact size of tumor and space of tumor in brain using artificial neural network algorithm. Classification methods as a naïve Bayes classifier, canny edge detection technique for scaling purpose and mathematical model such as entropy contrast homogeneity and correlations also used to improve the accuracy of the system. The proposed technique is useful to the physician for treatment of patients. The development of better techniques comes under future work. The existing systems for detection of brain tumor & the related algorithms which is used to detect brain tumour is viewed upon. Many algorithms are proposed, but there is recognition of accurate size and stage of the tumor for curing it so that the abnormal cell never develops is still a challenge. The proposed system used in the genetic algorithm and classification based technique to detect the tumor which gives an idea to physicians to cure the tumor. The future work will focus the analysis of the stored data with some mathematical formula which helpful to define the exact position of the tumor in brain.

**Ethical Clearance:** I testify on behalf of all co-authors that our article submitted to Indian Journal of Public Health Research & Development.

**Title:** Efficient approaches for Prediction of Brain Tumor using Machine Learning Techniques.

All authors: Jafar A. Alzubi, Ambeshwar kumar, Omar. A. Alzubi, R. Manikandan

1) This material has not been published in whole or in part elsewhere;

2) The manuscript is not currently being considered for publication in another journal;

3) All authors have been personally and actively involved in substantive work leading to the manuscript, and will hold themselves jointly and individually responsible for its content.

**Source of Funding:** Self.

**Conflict of Interest:** Nil.

**REFERENCES**

1. Mathew, A. R., & Anto, P. B. y), Tumor detection and classification of MRI brain image using wavelet transform and SVM. International Conference on Signal Processing and Communication (ICSPC), 2017: 75-78


7. Pawar, B., Ganbote, S., Shitole, S., Sarode, M.,


Association between Socio-Demographic Variables and Alcohol Dependency among Alcoholics attending Alcohol Deaddiction Camp Held at Gundlupet, Karnataka, India

M.C. Smitha¹, M. P. Somashekar², Nagendra³

¹Assistant Professor, Department of Community Medicine, JSS Medical College, SS Nagar, Mysuru, ²HOD, PG Department of Social Work, JSS College of Arts, Commerce and Science, B.N. Road, Mysuru, ³Medico Social Worker, Department of Community Medicine, JSS Medical College, SS Nagar, Mysuru

ABSTRACT

Introduction: Alcohol drinking is common practice in many parts of the world including India. It leads to serious social, physical and mental consequences as per the survey of WHO 2011. Many studies have shown that alcohol use exposes the individual to acute health conditions like road traffic accidents and risk of acquiring chronic diseases. Hence the present study was conducted to determine the association between socio-demographic variables with severity of alcohol dependence among the chronic alcoholics.

Methodology: It is a cross sectional study conducted at Gundlupet, rural part of Mysuru District. Severity of Alcohol Dependence Questionnaire (SADQ) was used to measure the severity of alcohol dependency among the chronic alcoholics. Information on socio-demographic variables was obtained by a self-administered questionnaire. The obtained data was entered in Microsoft excel and analyzed using SPSS version 23. Descriptive statistics and Chi-Square analysis was used to find the association between socio-demographic variables and severity of alcohol dependency.

Results: 78% of alcoholics had Severe Alcohol dependency, 8% had Moderate and 4% had Mild alcohol dependency. Residence and Education were found to be significantly associated with severity of alcohol dependency.

Conclusion: More than ¾ of the alcoholics are having severe alcohol dependency while remaining are having mild and moderate alcohol dependency. Place of Residence and Education were found to be significantly associated with severity of Alcohol dependency.

Key words: Alcohol dependency, Socio-demographic variables, Rural India

INTRODUCTION

Even today consuming alcohol is a common practice in the history of mankind. It affects the individual physical, social and psychological health status. It is a progressive disease where an alcoholic finds a lot of difficulties to quit drinking and falls in to its effects knowing its bad effects. Alcoholic faces various problems due to his addiction to alcohol. If he stops drinking, he will face withdrawal symptoms.¹

Systematic reviews of various longitudinal studies show that different socio demographic variables have differential effects on the alcoholics and they are very influential in motivating them to an alcohol dependency status.² Smith study indicates that alcohol users are increasing in the world wide and there is a urgent need to curb this progressive disease. According to their study conducted among alcoholics who have visited the OPD of Savitha medical college Chennai found that 65% of alcoholics are having substantial dependency on alcohol and 3% of alcoholics are severely dependent on alcohol.³ Hence in this present study we try to understand if the socio-demographic variables influence the dependency on alcohol.

Corresponding Author:
M. P. Somashekar
HOD, PG Department of Social Work, JSS College of Arts, Commerce and Science, B.N. Road, Mysuru.
E-mail: mswsomashekar@gmail.com

DOI Number: 10.5958/0976-5506.2019.00299.7
OBJECTIVE

To determine the association of the socio-demographic variables with severity of Alcohol dependency among chronic alcoholics attending the Deaddiction camp at Gundlupet Taluk

METHODOLOGY

The present community based cross sectional study was conducted among 50 alcoholic participants who participated in a community based Alcohol Deaddiction camp held at Gundlupet, Mysuru district from 07-07-2017 to 14-7-2017. Purposive sampling was adopted. Informed consent was received before conducting the interview. Confidentiality and voluntariness were the guiding principles of the study. The study was approved by the institutional ethical committee. Severity of Alcohol Dependence Questionnaire (SADQ) was used for collecting the details of dependency. The SADQ is a short, easy-to-complete, self-administered, 20-item questionnaire designed to measure severity of dependency on alcohol. There are five subscales with four items in each. They are physical withdrawal, affective withdrawal, withdrawal Relief Drinking, alcohol consumption, and rapidity of reinstatement. Each item is scored on a 4-point scale, ranging from Almost Never to Nearly Always, resulting in a corresponding score of 0 to 3. Thus the total maximum score possible is 60 and the minimum is 0. A score of 30+ indicates severe alcohol dependence and scores between 16 -30 indicates moderate dependence and score below 16 indicates a mild physical dependency. Interview was conducted on 13th and 14th of July 2017 to ensure that the respondent was psychologically fit to respond to the questionnaire.

STATISTICAL ANALYSIS

The obtained Data was entered in Microsoft excel and analyzed using SPSS V.22. Descriptive statistics like mean, proportion and standard deviation was used and inferential statistics like Fisher Exact Test was used to determine the association between socio-demographic variables and severity of alcohol dependency. The difference in the proportions was considered statistically significant at p ≤ 0.05.

RESULTS

The mean age of the study participants was 37.8 ± 9.6 yrs, the range being 22-71yrs with 64% less than 40 yrs. All the study participants were males. 50% belonged to rural area and 76% of them had completed Pre-University education. There was equal proportion of skilled and semi-skilled professionals and majority had evening and night shifts. The mean income was 1, 04,308 ± 69,306 Rs. 68% were married and all the married participants had children. 74% belonged to nuclear family and the rest to joint family and three generation families.

Fig- 1 Showing Alcohol Dependency among study subjects according to SAD Questionnaire

Among the study participants 78% had Severe Alcohol dependency as determined by Severity of Alcohol dependency Questionnaire (SAD Questionnaire), 8% had Moderate and 4% had Mild alcohol dependency
### Table 1: Association of Alcohol dependence with Socio-demographic variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mild and Moderate (Score &lt;16)</th>
<th>Severe (Score ≥16 -30)</th>
<th>p-value (Fisher Exact test)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;40yrs</td>
<td>8</td>
<td>24</td>
<td>0.495</td>
</tr>
<tr>
<td>≥40 yrs</td>
<td>3</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>2</td>
<td>23</td>
<td>0.017*</td>
</tr>
<tr>
<td>Rural</td>
<td>9</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;Pre University</td>
<td>8</td>
<td>30</td>
<td>0.013*</td>
</tr>
<tr>
<td>≥Pre University</td>
<td>3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skilled</td>
<td>6</td>
<td>19</td>
<td>0.733</td>
</tr>
<tr>
<td>Unskilled</td>
<td>5</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td><strong>Shift in work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning</td>
<td>3</td>
<td>19</td>
<td>0.206</td>
</tr>
<tr>
<td>otherwise</td>
<td>8</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td><strong>Annual income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1,00,000</td>
<td>8</td>
<td>28</td>
<td>0.951</td>
</tr>
<tr>
<td>≥1,00,000</td>
<td>3</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>7</td>
<td>25</td>
<td>0.977</td>
</tr>
<tr>
<td>Single</td>
<td>4</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td><strong>Type of family</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td>8</td>
<td>29</td>
<td>0.154</td>
</tr>
<tr>
<td>Three Generation</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Joint</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Children</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>6</td>
<td>23</td>
<td>0.793</td>
</tr>
<tr>
<td>Absent</td>
<td>5</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

*significant at p-value <0.05

Residence (p=0.017) and Education (p=0.013) were found to have significant association with severity of alcohol dependency.

**DISCUSSION**

WHO Statistics reported that there is significant association between SADQ score and annual income (p=0.005), marital status (p=0.04), education (p< 0.0001), occupation (p=0.008) and work timings (p=0.002). WHO also reported that severe dependency of alcohol among urban inhabitants is due to lack of family support, increased peer pressure and easy availability of alcohol. Residence (urban or rural) and education are found to be significantly associated with severity of alcohol dependency. Pillai, et al., showed that significant associations between ADS score and annual income (p=0.001), education (p=0.001) and work timings (p< 0.0001). Further he proves that alcohol dependent men take more sick leave than other employees and men with
lower education and lower standard of living would opt for a risky usual quantity of alcohol (c60 g/ drinking day). In our study Education and Residence were the two socio-demographic variables found to be statistically associated with severity of Alcohol dependency. With respect to Education it was seen that lesser the education more severe is the dependency. This could be attributed to educated individuals being better informed about the ill effects of alcohol compared to the counterpart; it was also found that individuals belonging to urban area had a more severe dependency. This may be due to better availability of alcohol in urban areas, peer pressure and lack of monitoring due to nuclear family which is mostly the type of families at the urban setting. Froms the above studies and our study we conclude that socio-demographic variables influence the individual to addiction. The strength of our study is that it tries to find the association of various socio-demographic variables with severity of alcohol dependency in rural area which is a less explored research question. The limitation would be the small sample size and since all the study participants were males the influence of socio-demographic variables in female alcoholics has not been explored.

CONCLUSION

Among the study participants it was estimated that 78% had severe dependency, 8% had Moderate dependency and 4% had mild dependency of alcohol. Place of residence and education of an individual were found to be significantly determine the severity of alcohol dependency.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Obtained from Institutional Ethical Committee

REFERENCES

Prescription Pattern of Antibiotics for Upper Respiratory Tract Infection in Shah Alam, Malaysia

Kavitha Ashok Kumar¹, Mohammad Rafiq Bin Baderu Khisam², Ashok Kumar Jeppu³
¹Head of the Unit, Otorhinolaryngology, International Medical School, Management and Science University Shah Alam Malaysia, ²BMS, International Medical School, Management and Science University Shah Alam, Malaysia, ³Associate Professor and Head of the Unit, Biochemistry, International Medical School, Management and Science University Shah Alam, Malaysia

ABSTRACT

Background: Upper respiratory infection (URTI) is a contagious infection of the upper respiratory tract which includes the nose, pharynx and larynx. Most of these infections are viral in origin yet treated often with antibiotics. Overuse of antibiotics is a worldwide problem. The aim of this study is to evaluate the prescribing pattern of antibiotics in management of URTI among doctors in Shah Alam and to determine the antibiotics most often prescribed for URTI.

Material & Method: A cross sectional study was conducted at two private hospitals and seven clinics in Shah Alam. A total number of 128 doctors participated in this study. The data was collected through well-structured questionnaires. Analysis of data was done by using descriptive statistics.

Result: This study showed few prescriptions for antibiotics in treatment of URTI as most of doctors (89%) did not recommended it. Although the number of cases of URTI diagnosed weekly was high, yet most of them were non-bacterial and did not require any drugs. However, most of the doctors interviewed had not attended clinical antibiotic training though they were well aware of the latest Malaysian Antibiotics Guidelines. Amoxycillin was the most prescribed antibiotic in certain cases of URTI which needed antibiotic prescription.

Conclusion: Most of URTI cases do not require antibiotics for treatment. The prescription pattern of antibiotics in Upper Respiratory Tract Infection showed no difference between the doctors involved in hospitals and clinics.

Keywords: Antibiotics, Upper respiratory tract infection, doctors

INTRODUCTION

Upper Respiratory Tract Infection (URTI) is a contagious infection of our upper respiratory tract which includes the nose, pharynx, larynx, and bronchi. It may manifest as common cold, pharyngitis, laryngitis, epiglottitis, laryngotracheobronchitis (Croup), otitis media and sinusitis. Most of these cases are caused by viruses like rhinovirus, adenovirus, parainfluenza virus, herpes simplex virus, respiratory syncytial virus, Epstein-Barr (EB) virus, influenza virus, Coxsackie A virus, coronavirus and cytomegalovirus. Only 10% of these cases are caused by bacteria and warrant antibiotics. The common bacteria causing URTI are Beta-hemolytic streptococci, Pneumococci, Staphylococci, H. influenza, Corynebacterium diphtheria, and Chlamydia trachomatis¹. Overuse of antibiotics is a worldwide problem². Hence, WHO has used antibiotic prescription for URTI as an indicator for assessing the optimum

Corresponding author:
Ashok Kumar Jeppu
Associate Professor, Head of the Unit, International Medical School, Management and Science University
University drive, Shah Alam, 40100, Malaysia
E-mail: drashokkumarj@mail.com

DOI Number: 10.5958/0976-5506.2019.00301.2
or overuse of antibiotics. According to WHO report on prescription pattern of antibiotics in developing countries, over the period of 1982 - 2006, had shown increase in the rate of antibiotic prescription by 71%. Antibiotic use in URTI was 85-90% in developing countries like China, India, Thailand and South Africa. This can cause adverse effects, increase healthcare cost and may result in increased resistance to antibiotics. This study was conducted with the aim to evaluate the current trend in prescribing of antibiotics for URTI in Shah Alam, Malaysia.

MATERIAL AND METHOD

This is a cross sectional study, conducted on 128 doctors working in two private hospitals and seven clinics in Shah Alam evaluating the prescription pattern concerned with the use of antibiotics in the management of URTI. The convenient sampling technique was used. Medical officers in general medicine, otorhinolaryngology, pediatrics and emergency departments were included in this study. Houseman officer and other hospital staff who are not involved in drug prescription were excluded. Permission was taken from the heads of department of all the hospitals and clinics to conduct the study. Ethical clearance was obtained from the institutional ethical board.

Study tool: A questionnaire was developed after extensive literature search. It was pilot tested on a small group of 10 doctors and revised for ambiguity. The questionnaire included questions on their educational status, experience, status of their training on their antibiotic use, the frequency of treating patients with URTI and attitude towards prescribing antibiotics. A written informed consent was attached to each survey form that was answered by the respondents. A random selection of prescriptions from URTI patients treated in these healthcare institutions were collected to verify the actual prescribing behaviors and compared with the answered questionnaire.

Statistical Analysis: All the data collected was statistically analyzed by using SPSS version.

RESULT & ANALYSIS

In this study, a total of 128 doctors participated from 2 hospitals and 7 clinics in and around Shah Alam, Malaysia. 62.5% had >5 years of experience in clinical practice while 37.5% had 3-5 years of experience. Most of them (82%) had no special training on use of antibiotics .114 of the 128 doctors were aware of the latest Malaysian antibiotic guidelines (Table 1).

<table>
<thead>
<tr>
<th>Question</th>
<th>Number of doctors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Working experience</td>
<td>3–5 years 48 (37.5%)</td>
</tr>
<tr>
<td></td>
<td>&gt;5 years 80 (62.5%)</td>
</tr>
<tr>
<td>2 Have clinical antibiotic training</td>
<td>Yes 23 (18%)</td>
</tr>
<tr>
<td></td>
<td>No 105 (82%)</td>
</tr>
<tr>
<td>3 Familiar with latest Malaysian guidelines</td>
<td>Yes 114(89%)</td>
</tr>
<tr>
<td></td>
<td>No 14(11%)</td>
</tr>
</tbody>
</table>

URTI was encountered frequently by our study population. The number of cases of URTI treated by the doctors per day is shown in Figure 1. Fifty-five doctors claimed to see more than 10 cases of URTI per day, while forty said they saw about >5-10 cases per day. Eight doctors dealt with 1-5 cases while twenty-three treated less than 1 patient of URTI per day.
Recommendation for antibiotic use:

In our study, only 14 out of 128 doctors (11%) recommended antibiotics for URTI treatment while the vast majority 114 (89%) did not prescribe it. The diagnosis for which antibiotics prescribed were acute tonsillitis, acute sinusitis and otitis media. Among the antibiotics prescribed, the most common drug was of penicillin group (amoxicillin), followed by cephalosporin and macrolides (Figure2).

Alternative treatment methods used in the treatment of URTI:

The doctors in our study group used alternative options to provide symptomatic relief to patients with URTI. Seventeen recommended high dose of vitamin C, forty-three prescribed antihistamines, twenty-five suggested hydration therapy, fifteen traditional remedies while twenty-five recommended rest and allowing self-recovery (Figure3).

DISCUSSION

In this study, a total of 128 doctors participated. Most of them were expert in the treatment of URTI with 80 having 5 years or more experience, while 48 had about 3-5 years of clinical experience. Due to their vast experience, they were aware of the latest Malaysian National Antibiotics Guidelines (NAG). However, majority of them had never attended any workshop/training on antibiotic use. It is a challenge for clinicians to identify between viral and bacterial infection. Most of the drugs given are aimed to minimize the symptoms and promote effective recovery. In our study, most of the doctors (89%) did not recommend antibiotics for URTI cases with only 11% preferring to use antibiotics in treatment of URTI. An earlier study in primary care settings in Malaysia by Teng et al reported use of antibiotics in 33.8% of URTI cases. In a similar study in India, Kotwani and Hollaway reported use of antibiotic in 45% and 57% of uncomplicated URTI cases in public and private hospitals respectively. Similar data was presented in a systematic review from China where 83.7% of patients with URTI were prescribed antibiotics. An alarming 18.4% were prescribed 2 antibiotics while 1.1% got 3 antibiotics. The authors however mentioned about the downward trend in antibiotic prescription in recent years. Mohitosh et al in Bangladesh too reported URTI to be a common cause for antibiotic prescription. Even in a developed country like France a study on antibiotic use in paediatric age group between 2008-2012 reported an unacceptable higher use of antibiotics.

We have observed a decrease in the prescriptions for antibiotics in our study. This may be attributed to the study being conducted in an urban area with availability of specialist care and the doctors being aware of the antibiotic guidelines. The reasons cited by the respondents for not prescribing antibiotics were to
prevent antibiotic resistance among patients, to prevent side effects especially to infants and young children, the type of causative microorganism and the level of severity of the case. Instead of antibiotics, some of the doctors in our study preferred to use alternative methods to treat URTI and provide symptomatic relief. Prescription of anti-histamines was the commonest among them. Others included giving high doses of Vitamin C to help boost the immune system, hydration treatment or fluid replacement, anti-inflammatory drugs or suggesting rest as they believed in self-recovery. Similar observation was made by Reshmi et al who also reported the use of symptomatic treatment for patients with URTI.

In our study, there were 14 cases of URTIs where antibiotics were used. In some cases of tonsillitis, laryngitis and sinusitis antibiotic coverage was needed to prevent complications in immunocompromised individuals or when virulent organism was suspected.

The most prescribed drug was of Penicillin group (amoxicillin), followed by cephalosporin and macrolides. Similar prescription pattern has been described by Teng et al. The choice of antibiotics given maybe due to the commonest causative organisms being gram-positive type of bacteria such as Streptococcus. In Bangladesh, Mohitosh reported cephalosporins to be the commonest antibiotic prescribed. In a similar study in Kerala by Reshmi et al, azithromycin was the commonest antibiotic prescribe.

This is in contrast to the observations of Shamsuddin et al who in 2013 reported inappropriate use of antibiotics in 18% for URTI.

**CONCLUSION**

This study reveals that most doctors in Shah Alam are familiar with Malaysian Antibiotic Guidelines, which is reflected in fewer prescriptions for antibiotics in the treatment of URTI cases. When dealing with URTI, alternative symptomatic treatment like vitamin C, antihistamines, good hydration were advocated by our study group. However, a similar study in future on a larger population including both urban and rural healthcare settings as well as both private and public hospitals would be able to substantiate the changing trend in the prescription pattern of antibiotics among doctors for URTI in Malaysia.

**Limitation of the study:**

This study was conducted on a small population of doctors. All the doctors were working in urban, private health care settings. Hence the findings of this study do not reflect on the rural and public healthcare settings.

**Acknowledgement:** We acknowledge the contribution of the respondents for their participation in this study. We place on record our sincere thanks to International Medical School, Management and Science University for their support.

**Conflict of Interest:** Nil.

**Source of Funding:** Self

**REFERENCES**

5. WHO. Medicines Use in Primary Care in Developing and Transitional Countries. 2009; http://www.who.int/entity/medicines/publications/primary_care_8April09.pdf


Re-Standardization Makassar Healthy City based on Local Needs

Sukri Palutturi¹, Muhammad Alwy Arifin², Nurhayani²

¹Professor, ²Senior Lecturer, Health Policy and Administration Department, School of Public Health
Hasanuddin University, Makassar Indonesia

ABSTRACT

This study aimed to develop Makassar Healthy City standards and indicators based on local needs, including key indicators, general indicators and specific indicators according to the settings choices. Through in-depth interviews and focus group discussions, this study found that general indicators only change indicators regarding the level of awards, from national and international awards to provincial, national and international awards. Furthermore, the main indicators still refer to national policies. Seven of nine settings were identified in Makassar City based on local needs. There are changes or additions to indicators in almost all settings. Re-standardization of healthy districts/cities should be carried out in all districts/cities based on the local conditions.

Keywords: Re-standardization, Healthy Cities, Local Needs

INTRODUCTION

The Healthy Cities movement in Indonesia has long been carried out, even though it was officially effective since the publication of the Joint Regulation between the Ministry of Home Affairs and Health. Adipura and Healthy Cities are different but the goal of Adipura can strengthen the Healthy Cities goal. Indonesia has a Healthy Cities concept that is different from other countries. Although Healthy Cities in Indonesia has been running for more than a decade, the environmental and social health problems are the still main problem in urban areas, but the districts/cities receive the Healthy Cities award from the central government, how is the Healthy Cities really in Indonesia? How does the central government assess and determine the indicators used? The central government can set national indicators and standards, but it can be different from local governments because they have different needs, resources, capacities and even values and cultures so that different solutions can occur.

Several previous studies relating to Healthy Cities in Indonesia have been conducted, but specific research especially studying the Healthy Cities indicator used is rarely done. This study aimed to develop Makassar Healthy City standards and indicators based on local needs, including key, general and specific indicators according to the settings choices.

MATERIALS AND METHOD

This study was carried out in Makassar City, namely at Regional Planning and Development Board (Bappeda), Health Office, Tourism Office, Social Service, Food Security Service, Sanitation Office, City Planning Office, Healthy City Trustees and Healthy City Forum. Data to be collected consists of primary data and secondary data. Primary data was collected through depth interviews, observations and Focus Group Discussion (FGD). In-depth interviews were conducted with heads of agencies related to healthy cities structures such as Bappeda, Health Office, Tourism Office, Social Service, Food Security Service, Cleanliness Office, Healthy City Trustees and Healthy City Forum. This study used a qualitative research method with a case study approach where qualitative researchers conducted face to face interactions throughout the study. The variables or concepts in this study refered to the main indicators,
general indicators and specific indicators of Makassar Healthy City. Special Healthy City indicators refer to the settings of healthy districts/cities in Indonesia and can be developed based on local needs. Data analysis was conducted qualitatively with thematic analysis.

RESULTS

Seven of nine healthy city settings have been identified for Makassar City, namely:

a. Healthy settlements, public facilities and infrastructure
   1. A clean air program
   2. Appeal for the use of low-sulfur fuel and energy efficiency, through circulars, decrees, billboards, or leaflets.
   3. Regulations governing non-smoking area
   4. Incidence pneumonia
   5. Frequency carry out an ambient air quality test for a moment
   6. Implementation of clean air programs through 5 movements: 1 billion trees, car free days, areas without smoking, cycling and walking facilities
   7. Use of environmentally friendly alternative energy: solar cells, methane
   8. The air quality index category
   9. The existence of monitoring activities for chimney emissions in industrial activities
   10. The existence of motor vehicle emission testing activities
   11. River management policy
   12. River cleanliness conditions
   13. Riverbank conditions
   14. Carry out river monitoring
   15. Water Quality Index Value
   16. Community involvement in river management
   17. Carry out conservation activities around the river banks
   18. Clean water service coverage
   19. Coverage of drinking water quality
   20. Drinking Water Access Coverage
   21. Percentage of population using healthy latrines 64%
   22. Stop Defecation Village
   23. The efforts of the Regional Government to encourage people not to open defecation
   24. Drainage Planning Noting the Eco-Drain Concept
   25. Local Government Program in encouraging Community Participation in the construction of drainage
   26. The active role of the community reports the existence of inundation
   27. Public & Private Engagement in Maintenance of Drainage Systems
   28. The functioning of the drainage canal
   29. Community involvement in the process of maintaining drainage
   30. Services and public access to waste water infrastructure and facilities
   31. Domestic Waste Water Treatment Plant
   32. Quality Test of Communal IPAL Waste Water Effluent
   33. Availability of Fecal Treatment Plant
   34. Stool trucks operate into the Fecal Treatment Plant
   35. General environmental conditions in residential environments
   36. Waste handling includes activities
   37. Implementation Waste management with the 3R principles
   38. Final processing sites Waste does not pollute the environment
   40. Length of garbage collection at TPS
   41. Aides larva numbers in settlements
   42. PSN and Routine Work
   43. Incidence) of filariasis cases
   44. Housing / settlement Free of floods
   45. Number of healthy houses
   46. Incidence / case of pulmonary tuberculosis
   47. Outbreaks of diarrheal diseases
   48. Outbreaks of DHF
   49. Outbreaks of Malaria
   50. Number of villages that have health service facilities
   51. Percentage of posts in the regency in accordance
with the number of health centre
52. The number of active alert villages
53. Health centre with Sanitation Clinic services
54. Tree planting program for the community
55. Available parks and urban forests
56. Percentage of schools implementing healthy schools (UKS)
57. Percentage of schools that take part in the “Adiwiyata program”
58. Availability of Healthy Canteen
59. Availability of adequate toilets (separate between men and women)
60. Availability of places of worship in schools
61. “Saptapesona School “security, order, cleanliness, beauty, and hospitality
62. Availability of segregated bins
63. Waste Management in schools
64. Available public facilities (sports and play)
65. Market management policy program
66. Supervision regarding market management
67. Market community involvement in participating in market sanitation
68. Clean urban market environment
69. Enough toilets and meet the requirements on the market
70. Parking lots available in urban markets
71. Available play facilities for children
72. The arrangement of informal traders
73. Regulations on handling street vendors
74. Availability of Healthy Canteen
75. Availability of adequate toilets (separate men and women)
76. Availability of disaggregated bins
77. Waste management in traditional markets
78. Availability of places of worship

b. Traffic Order Zone and Transportation services
1. Car free day area
2. Clean, orderly and neat terminal conditions
3. Public facilities in the terminal
4. Availability of traffic signs
5. Special facilities for nursing mothers at the terminal
6. Crime in the terminal decreases
7. Availability of smoking ban in the terminal area
8. Availability of smoking ban on the vehicle
9. Examination of the feasibility of public transport vehicles
10. The number of traffic accidents decreases
11. The existence of suitable pedestrian facilities
12. Non-smoking public transport vehicles
13. A routine health inspection program for public transport drivers
14. Availability of bus stops that meet the requirements
15. Availability of an orderly traffic area
16. Availability of a workshop to monitor exhaust emissions
17. Availability of a smart driving training program for the driver
18. The awarding of exemplary public vehicle crew training awards
19. Giving an award of obedience to the driver

c. Healthy industries and offices
1. Locations specifically for industrial zones
2. A smoking ban in the office environment
3. Places of worship in offices
4. Special arrangements for the informal sector
5. Health insurance for workers in all industries
6. The presence of industrial waste pollutes the environment
7. Community complaints about cases of industrial pollution
8. Decreasing work accident rates
9. Decreased unemployment
10. Availability of training activities in the vocational training center
11. Implementation of Environmental Management
12. Special room for nursing mothers
13. Enough Toilets (separate Men and Women)
14. Availability of Parking Lots  
15. Availability of Healthy Canteen  
16. Maintain cleanliness  
17. Availability of first aid  
18. Availability of Green Open Space  
19. Availability of disaggregated bins  
d. Healthy Tourism  
1. Availability of tourist information in public places  
2. Information on health facilities for tourists at the location  
3. The entire hotel is worthy of health  
4. Availability of healthy restaurants  
5. Increasing number of tourists per year  
6. Tourists have been insured  
7. Food poisoning in tourists for the past year  
8. Decreased cases of accidents in tourism objects  
9. Transportation available in tourist areas  
10. Emergency response/safety hall in tourist area  
11. Public facilities available  
12. Waste disposal facilities available  
13. Clinic/first aid facilities available  
14. Telecommunication facilities available  
15. Souvenir facilities available  
16. Worship facilities available  
17. The presence of tourism police  
18. Smoke-free zone  
19. Availability of Parking Lots  
e. Food Security and Nutrition  
1. Increased food crop production  
2. Food Production Supervision  
3. Food Diversity  
4. Food Processing Monitoring  
5. Cases of malnutrition  
6. Availability of food reserves and storage  
7. Food availability  
8. Cases of pesticide poisoning on farmers  
9. An extension of integrated pest control and use of pesticides  
10. The functioning of food distribution institutions in the community  
11. Food Distribution Monitoring  
12. The existence of organic farming programs by the government and the community  
f. Healthy-Independent Community Life  
1. The existence of a regular sports movement in the community/office  
2. Decreased cases of drug use  
3. The existence of community groups for drug and HIV/AIDS prevention  
4. Availability of community compliance not to smoke in public places  
5. Availability of an anti-smoking movement  
6. Coverage of clean water services  
7. Availability of a routine inspection of the quality of clean water  
8. Increased quality of clean water  
9. Healthy food, restaurant Food Management Place services  
10. Government program on healthy home improvement  
11. Increased coverage of the use of health services  
12. Availability of youth counseling service facilities  
13. Availability of a routine health check on school children  
14. Childbirth assistance by trained personnel  
15. Availability of mental health services at health centers  
16. A functioning sanitation clinic service  
17. Availability of an anti-alcohol movement by the community  
18. The existence of an anti-drug movement by the community  
19. Availability of is a special drug prevention service  
20. Decreased drug use cases  
21. Increased immunization coverage  
22. The functioning of an active Posyandu  
23. Coverage of visits to health centre  
24. PSN movement in schools, households, public spaces
25. Free aides larvae at school, household and public spaces

26. The existence of community movement in preventing degenerative diseases

27. Information on risk and efforts to prevent degenerative diseases

28. The existence of community groups in overcoming nutritional problems

29. Increased Protein Energy Deficiency for pregnant women

30. Cases of pregnant women who are anemic and lack iodine

31. Decreased people lack of vitamins

32. Decreased weight of low birth baby

33. Increased awareness of nutrition families

34. Number of health centre that provide basic services for the poor

35. The existence of health insurance for the community

g. Healthy Social Life

1. Decreasing poverty rate (4% -6%)

2. The existence of beggars and homeless people in public facilities

3. Decreasing number of drug users

4. The decline in the number of prostitutes

5. Availability of a halfway house for street children

6. The existence of informal workers

7. The existence of children’s creativity development and elderly productivity

8. The existence of an education program dealing with disability

9. Availability of facilities for people with disabilities in public places

10. Regional government policy on handling communities in remote areas

11. Public transportation facilities to remote areas

12. Health facilities in remote areas

13. Adequate Child Care Facilities

14. Special programs for abandoned, elderly

15. Disaster preparedness program for the community

16. Incidents of riots/anarchists

17. Having a contingency plan for a disaster problem

18. Availability of facilities for disabled people

19. Availability of street children control program

**DISCUSSION**

Environmental infrastructure facilities are places used by the general public to function properly. Specific indicators of the settlement area arrangement of healthy facilities and infrastructure nationally are 59 assessments while based on the results of FGD 78 special indicators are obtained. This environmental aspect is very important because it is a determinant of public health status.

Additional indicators of this setting include monitoring activities for chimney emissions in industrial activities, motor vehicle emission testing activities, access to drinking water. Other indicators include the availability of healthy canteens in schools, the availability of places of worship in schools, waste management in schools, availability of play facilities for children in traditional markets, availability of healthy canteens in traditional markets.

Indicators of the setting area of traffic and transportation services, nationally, there are 16 indicators of assessment while based on local needs there are additions to 19 indicators. These additional indicators are the availability of traffic signs, the existence of smoking bans on vehicles and the existence of a rider compliance award. The problem of transportation and traffic congestion is a big issue, especially in large cities. The impact is quite complex on health both from the social aspect and the incidence of disease. Furthermore, there are 11 indicators for industrial estate and office buildings, while based on in-depth interviews there are changes to 19 assessment indicators. The additional indicators include the availability of separate toilets between men and women, and availability of parking spaces, availability of healthy canteens.

Specific indicators of the setting of healthy tourism, nationally, there are 13 assessments, while based on focus group discussion there are 19 indicators. The indicators are available telecommunications facilities, available souvenir facilities, available facilities for places of worship and the availability of parking spaces. Healthy tourism is one indicator of healthy cities set globally.
Specific indicators of the setting of food and nutrition security, nationally, there are 8 indicators while based on in-depth studies identified 12 indicators, namely: the supervision of food production and processing, and the existence of a variety of foods.

Specific indicators, the setting of healthy-independent communities independent, nationally, there are 38 indicators of assessment, while based on the study there are only 35 indicators. Some indicators are not valid in the Makassar City, such as the presence of new cretin patients; this is because cases of cretin patients have not been found in Makassar City. Finally, the indicators for a healthy social life, nationally, there are 17 indicators of assessment while based on local needs there are 19 indicators. The indicators include the existence of facilities for disabled people, and the existence of a street children control program. One of the biggest problems in implementing healthy cities is social problems 17,18.

CONCLUSION AND RECOMMENDATION

This study found that the main indicators still refer to national policies. Seven of nine settings have been identified for Makassar Healthy Cities. There are changes or additions to indicators in almost all settings. This study recommends that the standardization of healthy districts/cities should be carried out in all districts/cities based on the local needs.

Conflict of Interest: None

Source of Funding: Hasanuddin University, Makassar Indonesia

Ethical Clearance: Taken

REFERENCES

15. Hancock T, Norris T, Lacombe R, Perkins F.


The Effect of Progressive Muscle Relaxation in Reducing Fatigue among Nurses in Mental Hospital

Rosinta Uli¹, Robiana Modjo¹

¹Occupational Health and Safety Department, Faculty of Public Health, Universitas Indonesia, Kampus UI, Depok, Indonesia

ABSTRACT

Nursing, an occupation dominated by women, is typically high in job demands, work stress levels, and fatigue. Fatigue on nurses affect the neurocognitive function and also the performance of the nurses.

Progressive Muscle Relaxation, a technique involving sequential tensing and relaxation of major skeletal muscle groups, aims to reduce feelings of tension, to lower perceived stress, and to induce relaxation.

This research aimed to find out the effect of progressive muscle relaxation in reducing fatigue on nurses at Mental Hospital with indicators of pulse rate, oxygen saturation, and subjective feelings of fatigue. This quasi-experimental study was performed on 42 nurses within-subject design with a pre-post test, which was conducted in two treatment i.e. routine activity (without progressive muscle relaxation) and progressive muscle relaxation that performed in one group of the same subjects at different times.

The progressive muscle relaxation consists of two basic parts to progressive relaxation: 1) the tension in muscles, and 2) the relaxation of each muscle group. The results showed that the progressive muscle relaxation may reduce fatigue. It can be observed that the progressive muscle relaxation had influence in the decreasing of pulse rate, increasing of oxygen saturation, and decreasing of the subjective feeling of fatigue score.

Keywords: Nurse Fatigue, Progressive Muscle Relaxation, Pulse Rate, Oxygen Saturation, Subjective Feeling Fatigue

INTRODUCTION

Fatigue implies in negative impact in short and long term. Short-term impact, for example, the emergence of discomfort, decreased strength and decreased motor control. The impact of short-term leads to reduced performance, productivity, quality of work, and an increase in the incidence of accidents and human error. In the long term, prolonged fatigue can lead to absenteeism, skeletal muscle disorders, and disability.

Fatigue is commonly observed in nurses. Workload, work hours, work structures, and many other factors can indirectly or directly cause fatigue in multiple industries and affect safety (¹). Fatigue on nurses can lead to medical errors, performance setbacks, decreased mental acuity, and social issues (²,³). That becomes an issue that stimulate efforts to examine and deal with the problems of fatigue on nurses to improve the quality of service to patients and improve patient satisfaction as well as to find management approaches a comprehensive fatigue to create a supportive work environment for nurses to prevent fatigue and improving performance (⁴).

Based on a previous study conducted in September 2017 about fatigue of nurses in Mental Hospital, the result which has been obtained showed that 52% of nurses experienced moderate to heavy with fatigue, while the rest experienced mild fatigue. The fatigue experienced by nurses include a physical or psychic fatigue-related workload, lack of personnel and the working environment with the smells of the less savory originating from the patient’s body that sometimes cause nausea and dizziness, as well as internal factors, be age, gender, educational level and marital status.

Progressive muscle relaxation techniques (Progressive Muscle Relaxation) is one of the non-
pharmacological intervention and is a systematic technique that can be used to reduce stress and achieve a state of relaxation\(^{(5)}\). Some of the results of the study mentioned that the progressive muscle relaxation therapy is effective for losing muscle tension, reduces stress levels and lower blood pressure\(^{(6)}\) and provide immediate and significant effects against fatigue marked with a decrease in pulse rate\(^{(7)}\). The purpose of this research is to implement and to find out the effect of progressive muscle relaxation on nurses at Mental Hospital. The results then could be a recommendation in the preparation of the program of health promotion in the workplace.

**METHOD**

The study design was quasi-experimental with a pre-post trial within the subject, which was conducted in two treatment i.e. routine activity (without progressive muscle relaxation) and progressive muscle relaxation that performed in one group of the same subjects at different times. This study aimed to know the direct effect of progressive muscle relaxation on the nurse’s fatigue objectively with the indicator of pulse rate, oxygen saturation, and subjectively with the subjective feeling of fatigue.

This research was conducted on 42 nurses at Mental Hospital. The criteria of a sample is a nurse managing staff; the sample does not have a history of infectious diseases or degenerative; minimum 1-year working period and at the time of research, not just finished running on leave (± 1 month before).

Measurement of fatigue was done after the respondents have the activity or work approximately 2 hours (pre-test) and after the treatment (post-test) (Figure 1). The instrument used to measure the fatigue objectively is the Pulse Oximeter with the aim to measure oxygen saturation and pulse rate. Meanwhile, the subjective measurement was carried out using the Subjective Self-questionnaire Rating Test (SSRT) from the Industrial Fatigue Research Committee which consists of 30 items of questions. The questionnaire consists of 10 questions that described the decreased activity (decrease in the level of activity), 10 the question illustrated the decline in the motivation of work (symptoms of weakening motivation) and 10 questions described the physical fatigue symptoms (symptoms of physical fatigue).

The analysis was carried out with the application of SPSS statistics version 22.0 to find out the difference in the average of the measurements before and after treatment as well as the measurement of the average difference between the treatment routine activity and progressive muscle relaxation treatment.

*Figure 1 Quasi-Experiments Design with Pre-Test and Post Test within The Subject.*
Progressive muscle relaxation techniques are sequential contractions and relaxation movements consisting of 14 movements and involve 5 muscle groups, namely arm/hand muscles, facial muscles, upper chest-abdomen, hips and thighs, and legs and feet. Progressive muscle relaxation sessions lasted for 20 to 30 minutes. The relaxation process started by tensing the muscle group; hold that tension for 5-7 seconds, then relaxing the muscles slowly for 20-30 seconds. Each movement is done 2-3 times. The fourteen of progressive muscle relaxation movements were: 1) exercising the hand muscles; 2) training rear hand muscle; 3) training the large biceps/muscles on the upper part of the arm; 4) training the shoulder muscles to relax; 5 and 6) relaxing facial muscles, such as the forehead, eyes, jaw, and mouth; 7) relaxing the tension experienced by the jaw muscles; 8) relaxing the muscles around the mouth; 9) relaxing the front and back neck muscles; 10) training the front neck muscles; 11) training back muscles; 12) relaxing the chest muscles; 13) training the abdominal muscles; and 14) training the leg muscles such as thighs and calves.

RESULTS

Characteristics of Respondents

Table 1 Frequency Distribution Based On The Characteristics of Respondents

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percentage</th>
<th>SD</th>
<th>Mean</th>
<th>(Min-Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-35 years</td>
<td>78.6 %</td>
<td></td>
<td>32.48</td>
<td>25 – 46</td>
</tr>
<tr>
<td>36-45 years</td>
<td>16.7 %</td>
<td>5.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 45 years</td>
<td>4.7 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>31%</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Female</td>
<td>69%</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Nutrition Status (by Body Mass Index)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>0 %</td>
<td>3.65</td>
<td>25.11</td>
<td>18.90 – 34.29</td>
</tr>
<tr>
<td>Normal Range</td>
<td>57.14 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>28.57 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td>14.29 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Length of Work</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-5 years</td>
<td>28.57 %</td>
<td>5.55</td>
<td>8.48</td>
<td>2 – 25</td>
</tr>
<tr>
<td>6-10 years</td>
<td>50 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 10 years</td>
<td>21.43 %</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Objective and Subjective Measurements
Figure 2. Above right: Average Pulse Rate Based on Treatment, above left: Average Oxygen Saturation Based on Treatment, below: Average of Score of Subjective Feeling Based on Treatment

From the Figure 1 above shows that there is an increasing exhaustion of the respondents on measuring pre-test on the first day of treatment (routine activity) and the second day of treatment (progressive muscle relaxation) compared with the initial measurement (baseline). It can be observed from the increase in the average frequency of the pulse, a decrease in average oxygen saturation as well as an increase in the average score of subjective feelings of fatigue. Instead, on the measurement of post-test showed a decrease in fatigue for each treatment (frequency of the pulse oxygen saturation is reduced, increasing and decreasing the subjective feeling of fatigue score) compared the results of the pre-test.

Table 2 Measurement According to The Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pulse Rate (times per minute)</th>
<th>Oxygen Saturation (%)</th>
<th>Subjective Feelings of Fatigue (Score)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Difference Pre-Post</td>
<td>SD</td>
<td>Mean Difference Pre-Post</td>
</tr>
<tr>
<td>Routine activity (n=42)</td>
<td>9,548</td>
<td>4,660</td>
<td>0,238</td>
</tr>
<tr>
<td>Progressive Muscle Relaxation (n=42)</td>
<td>25,643</td>
<td>5,318</td>
<td>0,405</td>
</tr>
</tbody>
</table>
Table 3 Decreased Fatigue Level Based on The Treatment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Routine Activity</th>
<th>Progressive Muscle Relaxation</th>
<th>Mean Difference</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Pulse Rate</td>
<td>87,14</td>
<td>2,58</td>
<td>75,00</td>
<td>4,55</td>
</tr>
<tr>
<td>Oxygen Saturation</td>
<td>98,31</td>
<td>0,84</td>
<td>98,50</td>
<td>0,99</td>
</tr>
<tr>
<td>Subjective Feelings of Fatigue</td>
<td>62,81</td>
<td>13,28</td>
<td>46,14</td>
<td>11,42</td>
</tr>
</tbody>
</table>

Based on treatment, measurement results on indicator pulse and the subjective feeling of fatigue showed a significant difference between routine activities with progressive muscle relaxation (see Table 2). The magnitude of the influence of progressive muscle relaxation in reducing fatigue can also be observed from the coefficient of determination (R²) shown for the respective indicators (see Table 3).

DISCUSSION

Characteristics of Respondents

The range of age of respondents in this study was between 25 to 46 years. A person’s age is very influential factors towards the pulse which is an indicator of the work of the heart. This is similar to research conducted by Houghton, et al. which explained the function of the vascular decreased significantly with aging and contribute to decreased heart rate (8). Age also influence on physical strength and mental muscles, that showed that there was a certain age at which a worker would experience changes work achievement. At an older age generally occurs a decrease in muscle strength, but it was balanced by a better emotional stability than a young workforce that can be positive in doing work (9). This is in accordance with the research done by Chang, et al. which mentioned that work fatigue related to age and physiological symptoms (9), a lot of health problems (10). This was in accordance with the research conducted by Hunter mentioned that gender contributes to muscle strength (11). In addition, other studies also mentioned that at a particular age and sex, children, adults, and men are more resistant to fatigue the muscle than older people and women (12).

The calculation based on nutritional status, 42 of those respondents, 18 people were categorized as respondents with excess body weight and obesity (42,86%) according to Indonesian Ministry of Health criteria year 2013. Consequently, it might affect the ability and endurance of the respondents in their work performance which closely related to the status of nutrition.

The influential working period significantly related to fatigue. The longer working period effect on work fatigue levels caused the level of monotonous work that has accumulated over the years (13). Workers with a longer working period has more experience and more familiarity with the work which prevent the occurrence fatigue (9). The previous study also mentioned that nurses working with less than 2 years have a fatigue score higher than the nurses who work for more than 6 years (14). Another research showed a statistical relationship between nurse fatigue with age and work experience. The results show that the longer work experience and older age related to the lower the perceived fatigue. This is because with increasing experience in the work, the less pressure of the job (15).

The Effect of Progressive Muscle Relaxation on Pulse Rate

Pulse rate was affected by the presence of stress or at the rest or break time. The factors that affect the pulse of which are gender, age, physical activity, fitness level, ambient temperature, body posture, emotion, body size, as well as the consumed drugs (16).

This result was in line with the results of previous research which showed a decrease in the frequency of the pulse on nurses after making the progressive muscle
relaxation\textsuperscript{(17)}. The other studies have also proved that the progressive muscle relaxation therapy give immediate and significant effects against fatigue is characterized by a decrease in pulse rate \textsuperscript{(7)}. Furthermore, research shows that the progressive muscle relaxation can heart rate, blood pressure, oxygen consumption and regulate the activity of sweat glands, changing patterns of brain waves, and finally, it lowers the activity of physical motor\textsuperscript{(18)}.

The Effect of Progressive Muscle Relaxation on Oxygen Saturation

The results of this research were not in accordance with the previous which mentioned that at the time of relaxation happens, there was an increase in oxygen levels \textsuperscript{(19)}. Other studies also mentioned that at the time of relaxation of muscle fibers, the extension occurs with declining conductance of nerve impulses to the brain, decreasing brain activity, and other body functions as the response of relaxation. The other responses to relaxation were the declining number of pulse, breathing, decreased blood pressure, and increased consumption of oxygen \textsuperscript{(20)}.

The absence of any significant differences between the average oxygen saturation (post-test) when just doing routine activity when done with progressive muscle relaxation may occur due to oxygen saturation values in each person is different and many factors influence, among others 1) internal factors, i.e., age, gender, diseases of pulmonary function disturbance, acidity (pH), and the partial pressure of carbon dioxide (CO2); and 2) external factors, namely food intake to increase the levels of Hb, early mobilization and gymnastics parturition \textsuperscript{(21)}. However, these results may differ when progressive muscle relaxation did more often and regularly.

The Effect of Progressive Muscle Relaxation on Subjective Feelings of Fatigue

The results of this research are consistent with research done Ivancevich, et al \textsuperscript{(22)}, which mentioned that progressive muscle relaxation psychologically could produce a feeling of a healthy, quiet and peaceful, a feeling that everything was in control as well as a decrease in the tension and anxiety. The study mentioned that progressive muscle relaxation technique to effectively cope with tension, anxiety, insomnia, depression, fatigue, irritable bowel syndrome, muscle spasms, neck and back pain, high blood pressure and mild phobia; the study mentioned that progressive muscle relaxation was a systematic therapy effective for overcoming the stress on nurses to reach a state of deep relaxation \textsuperscript{(17)}. Another study revealed that Progressive Muscle Relaxation was one of the non-pharmacological intervention and a systematic technique that can be used to reduce stress and achieve a state of relaxation\textsuperscript{(5)}.

CONCLUSION

The results showed that the progressive muscle relaxation technique was more effective for reducing fatigue on nurses, compared with just doing routine activities without relaxation. It was observed from the decline of its influence on the frequency of the pulse and lowers the subjective feeling of fatigue score respondents indicating a more significant result than routine activity.

Conflict of Interest: Hereby the authors declared that there is no conflict of interest in this research with any other parties.

Acknowledgment: This work was supported by Hibah PITTA 2018 funded by DRPM Universitas Indonesia No.5000/UN2.R3.1/HKP.05.00/2018.

Ethical Clearance: This research has been approved by Ethical Board Committee, Faculty of Public Health University Indonesia and has been approved for ethical clearance by Ethical Board Committee, Faculty of Public Health University Indonesia.

REFERENCES

5. Essa RM et al. Effect of Progressive Muscle Relaxation Technique on Stres, Anxiety and


Situational Analysis of Career Choices among Indonesian Nurses Returnees

Ferry Efendi1, Nursalam Nursalam1, Elida Ulflana1, Rista Fauziningtyas1
1Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia

ABSTRACT

Background: There are few studies about the Indonesian nurse returnees’ career after working and living overseas. Therefore, the present study addressed the current status of their employment. Purpose: This paper explores the situation of return migration among Indonesian nurses who return to the country of origin. Methods: Descriptive study using the latest survey of Indonesian nurse returnees. Results: The career situation of Indonesian nurse returnees varies on the post-migration stage. Half of the returnees were working out of nursing areas (57.2%) at the time of the survey. Returnees predominantly work as own account worker when they get back into the labor market. While the rest were working as private employees, Japanese translators, Indonesian state own enterprises employee, hotel staff, insurance agent, and teacher. Conclusion: The result of this research inquiry adds new understanding and knowledge in an area of return migration of nurses that has been relatively unexplored. Returnee career situations were relatively similar number between nursing and non-nursing areas.

Keywords: return migration, career choices, Indonesian nurses.

INTRODUCTION

In regard to the international nursing migration, Indonesia has become an exporter of nurses to economically developed countries1-3. The United Arab Emirates, Netherlands, Kuwait, Great Britain, and Saudi Arabia have been among the receiving countries since 19964. The active recruitment of Indonesian nurses abroad is dominated by private recruiters followed by government facilitation5. Regulation of international nurse migration under bilateral agreement has grown through national regulatory bodies which started with Japan followed by East Timor6,7.

The generalizability of much-published research on the return migration issue is problematic, not only in the Indonesian context but also in the global landscape. Return migration is often discussed as a new strategy to get a brain gain. However, early evidence indicates this could also lead to brain waste8. Following the current review, it was apparent that published studies failed to gain insight on return to practice for nurses in the post-migration stage. This indicates a need to understand various circumstances among nurse returnees under workforce migration flows. This present study seeks to remedy these problems by analyzing Indonesian returnees on their current occupational choice.

METHOD

A descriptive study design was conducted to describe the current occupational of Indonesian nurse returnees. A survey involving Indonesian nurse returnees were conducted to track the latest returnees’ occupation.

RESULTS

The career situation of Indonesian nurse returnees varies on the post-migration stage (Table 1). As can be seen, half of the returnees were working out of nursing areas (57.2%) at the time of the survey. Returnees predominantly work as own account worker when they get back into the labor market. While the rest were working as private employees, Japanese translators,
Indonesian state own enterprises employee, hotel staff, insurance agent, and teacher. Respondents who chose not to return to nursing cited bad working conditions (86%), poor salary (74%), lack of confidence with their nursing skills (62%), unclear career paths or stalled career progressions (55%), difficulty in finding nursing jobs (58%), shift work (44%), unrecognized working experience in Japan (40%), feeling neglected by officials (40%), lack of respect (38%), and difficulty dealing with the certificate of registration (Surat Tanda Registrasi) process (22%). These reasons were repeated among returnees who opted out altogether from the nursing field. Deskilling was also cited by returnees who worked in Japan by stated they had lost their technical skills such as the ability to administer Intra Venous (IV) therapy. An emphasis on basic nursing care was voiced by returnees as an example of deskilling, as this activity was associated with lower grade work in Indonesia.

On the other hand, for those who stayed in nursing areas based on their employment setting the majority now work in private hospitals (27.2.6%). In contrast with previous respondents, those who stay in nursing jobs said they are passionate about nursing (92%), have a desire to help others (90%), expect to transfer skills and knowledge from Japan (88%), are aligned with their educational background (80%), have opportunities to open private nursing practices (67%), have opportunities to develop nursing specialties (particularly in geriatric nursing) (77%), have opportunities to develop long-term care services (54%), and have pride and noble works (41%).

Table 1 Career choices of participants (N=250)

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-nursing area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own account workers</td>
<td>66</td>
<td>26.4</td>
</tr>
<tr>
<td>Private employee</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>Japanese translator</td>
<td>24</td>
<td>9.6</td>
</tr>
<tr>
<td>Indonesian state own enterprises</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td>Hotel</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Insurance agent</td>
<td>7</td>
<td>2.8</td>
</tr>
<tr>
<td>Teacher</td>
<td>7</td>
<td>2.8</td>
</tr>
<tr>
<td>Nursing area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse in private hospital</td>
<td>68</td>
<td>27.2</td>
</tr>
<tr>
<td>Nurse in district hospital</td>
<td>28</td>
<td>11.2</td>
</tr>
<tr>
<td>Nurse in Japanese company</td>
<td>9</td>
<td>8.4</td>
</tr>
<tr>
<td>Community health center</td>
<td>2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

As Table 2 illustrates, the nursing specialties of returnees are widely spread out into different specialties. These include medical and surgical nursing (10.4%), general nursing (10.4%), mother and child nursing (4.8%), emergency nursing (4.8%), and community health nursing (0.8%).

Table 2 Nursing area based on specialties (N=107)

<table>
<thead>
<tr>
<th>Nursing specialties</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>General nursing</td>
<td>26</td>
<td>10.4</td>
</tr>
<tr>
<td>ICU/Pediatric care nursing</td>
<td>7</td>
<td>2.8</td>
</tr>
<tr>
<td>Emergency nursing</td>
<td>12</td>
<td>4.8</td>
</tr>
<tr>
<td>Operating theater</td>
<td>9</td>
<td>3.6</td>
</tr>
<tr>
<td>Medical &amp; surgical nursing</td>
<td>26</td>
<td>10.4</td>
</tr>
<tr>
<td>Mother and child nursing</td>
<td>12</td>
<td>4.8</td>
</tr>
<tr>
<td>Management nursing</td>
<td>8</td>
<td>3.2</td>
</tr>
<tr>
<td>Geriatric nursing</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Community health nursing</td>
<td>2</td>
<td>0.8</td>
</tr>
</tbody>
</table>
DISCUSSION

This study provides a profile of the career choices of Indonesian nurses after their return from overseas. The choice of nursing and non-nursing areas is quite similar with regard to numbers. One study in Jamaica showed a slightly higher proportion (76%) among returnees who come back into bedside nursing\(^9\). While other studies on the return migration of nurses did not clearly mention how many returnees came back into nursing\(^10\)-\(^12\). Findings from this present study show that the majority of returnees were working in various settings, including hospitals, clinics and communities. The highest numbers were working in private hospitals, followed by district hospitals, clinics in Japanese companies and community health centers. This data is similar in vein to the labor market for the Indonesian health workforce, which is dominated by the private sector\(^13\). The introduction of a zero growth policy on civil service numbers, liberalization of hospital ownership, and the passing of decentralization law in 1999 has significantly contributed to the dramatic growth of private health providers in Indonesia\(^13\). The presence of few returnees in district hospitals might reflect the low capacity of local government to employ nurses. On the other hand, nurses who work in Japanese clinic companies might feel interested in utilizing their skills and acquisition of the Japanese language. Returnees might possibly gain benefits by receiving a higher salary in Japanese company rather than a local business. With regard to returnee specialties in nursing, the dominant numbers were in medical and surgical nursing, and the fewest were in community health nursing. Further analysis on the competency of returnees and availability of job market are deserved to be done.

Returnees who work in non-nursing areas were dominated by the self-employed or those who were their own account worker. Piracha and Vadean\(^14\) viewed that returning migrants have a higher propensity to become self-employed. Those who opted out from nursing areas, also found work as private employees, Japanese translators, insurance representatives and teachers. A number of the most highly qualified nurses who work outside of nursing were evident in this study, especially those who were titled in Kangoshi and Kaigofukushishi positions. These returnees had excellent nursing competencies and a great opportunity to contribute to the development of nursing. They cited some reasons such as low salaries, unrecognized working experience, and lack of appreciation from the government as reasons for choosing to leave nursing jobs. This feeling of being uncared for and neglected among returnees might lead to demotivation toward the nursing profession itself. From the point of view of the nursing profession, brain waste was observed within this group. They could not transfer the skills and knowledge they had acquired abroad. Most health professional migration studies have highlighted that brain waste occurs during the immigration stage\(^15\)-\(^17\). In contrast to earlier ideas, this study observes that brain waste exists during the post-migration stage. This finding supports previous research which found that return migrants who were qualified could not find opportunities in their field of specialization\(^18\). In order to derive the maximum benefits of bilateral labor migration, Indonesia should manage migration of professional nurses by improving skill matching and recognition of skills. At the same time, in order to maximize the potential positive outcome of return migration this issue must be addressed with the Japanese counterparts through bilateral meetings.

CONCLUSION

The result of this research inquiry adds new understanding and knowledge in an area of return migration of nurses that has been relatively unexplored. Returnee career situations were relatively similar number between nursing and non-nursing areas. However, the brain waste phenomenon was evident among nurses as many were working outside nursing areas.

Ethical Clearance: This study obtained the Certificate of Ethical Clearance from the Research Ethics Committee of Faculty of Nursing, Universitas Airlangga, number 696-KEPK.

Source of Funding: This study was a self-funded research project.

Conflict of Interest: None.

REFERENCES


South-East Asia Region; 2017.


5. BNP2TKI. The Role of BNP2TKI on Mapping and Harmonization Migrant Workers, Jakarta: BNP2TK; 2012.

6. MOFA. Technical arrangement between the National Agency for the Placement and Protection of Indonesian Workers With the Ministry of Health of the Democratic Republic of Timor-Leste About Manpower Placement and Protection of Indonesian Midwives to Timor-Leste by Bilateral Agreement. Jakarta: Ministry of Foreign Affairs; 2011.


Analysis of Factors Affecting Malnutrition among Elderly in Panti Werdha Mojopahit Mojokerto

Arif Wicaksono1,2; Muhammad Sajidin1; Heri Tri Wibowo1

1Institute of Health Science Bina Sehat PPNI Mojokerto, 2Faculty of Nursing & Medical Ramathibodi Hospital, Mahidol University

ABSTRACT

Background: Old age as the final stage of the cycle in life is the natural development stage that will be experienced by every individual who reaches old age and is a reality that cannot avoid. In 2020, the number of elderly humans is predicted to be 28.8 million (11.34%) with a life expectancy of 71.1 years. The increase in the number of elderly populations is due to the rise in the socio-economic level of the community, progress in the field of health services, and an increased level of public knowledge. In 2020-2025 it is estimated that Indonesia’s elderly population is ranked fourth after China, India and the United States.

Material and Method: The research method uses factor analysis. The technique of sampling used in research is purposive sampling, with the elderly population at the Nursing Home. The purpose of this study is specifically to find out; Appetite; change in body weight; old cars; stress; neuropsychological disorders, BMI. The Collecting data using instruments, the questionnaire was used. Analysis results using SPSS version 25.0.

Findings: The research can be said that the variables and samples used to allow for further analysis. This evidence by the KMO value of 0.504 which means higher than 0.5. after that, we can see Rotated Component Matrix

Conclusion: Malnutrition of Risk factors in the elderly people at Mojopahit Mojokerto nursing home can be described as follows, Informal factors for the elderly: mobility, neuropsychological disorders; External factors: control nurses about elderly body weight.

Keywords: Elderly, Nursing, Nursing Home, Malnutrition.

INTRODUCTION

Malnutrition is a problem that always arises and becomes a serious thing for parents, elderly as the final stage of the cycle in life is the natural development stage that will be experienced by every individual who reaches old age and is a reality that it cannot avoid.1 Regarding population in the elderly, malnutrition appears today as the primary basis for public health. Mal-nutrition is caused by insufficient or inadequate nutritional intake which makes various damaging effects such as muscle wasting and body defenses. The same means that mal-nutrition in the elderly causes and worsens the state of weakness or dependence and contributes to the development of self-morbidity,2-5 a large number of older adults in Indonesia in the future brings positive and negative impacts. The positive effect, if the elderly population is in a healthy, active and productive condition. Seen from the other side, the large number of elderly people is a burden. if the elderly has health problems that result in an increase in the cost of health services, a decrease in income/income, an increase in disability, the absence of social support and an environment that is not friendly to the elderly population.6

Community Nursing Department, Bina Sehat PPNI Institute of Health Science, Indonesia.
Email: arifw@stikes-ppni.ac.id

DOI Number: 10.5958/0976-5506.2019.00304.8
Aging is a process of gradual or continuous change, personal, physical and social experiments and a unique perception of life, which is happy for some people and others, it is the initial value of a dark and sad stage of life. The aging process associated with changes in body composition, precisely due to a decrease in lean body mass. Malnutrition is a multifactorial disease, and in the elderly, many risk factors can worsen physiological performance that affects muscle mass and fat (FM), which globally seen for weight loss and body mass index (BMI). There are other things to note, the existence of chronic diseases, many drugs, cognitive impairment, depression, loss of role, and social isolation can act systematically with a decrease in digestive function, smell, and saliva, as well as hormonal profiles, which affect the nutritional status of the elderly.

For this purpose, it seems essential to identify malnutrition factors experienced by the elderly in high risk; In this case, a necessary step to promoting elderly health is gaining knowledge of their experiences and concerns during the aging process. The first step to identifying malnutrition at this age is to use reliable instruments and methods.

The world population is rapidly aging with estimates that this year until 2050 the proportion of the world’s population above 60 years will increase from 11% to 22%. The expected increase in the absolute number of older adults will triple from 605 million to 2 billion during this period. Based on population projection data, it estimated that in 2017 there would be 23.66 million older adults in Indonesia (9.03%). It predicted that the elderly population in 2020 (27.08 million), in 2025 (33.69 million), in 2030 (40.95 million) and 2035 (48.19 million). Because the number of older adults continues to increase, the provision of a better healthcare process for the elderly at both the hospital and the community is an obligation. Often, the focus of nutrition in the elderly is a healthy diet and exercise to minimize the risk of developing breast cancer from a lifestyle (such as cardiovascular disease, type 2 diabetes mellitus). Thus, there is ample evidence to suggest that energy-protein malnutrition (PEM) is a common and frequent problem in this age group, including in hospitals, nursing homes, and community environments.

The primary challenge along this line of research is to find out the most influential factors in malnutrition in the elderly in nursing homes using the mini nutritional assessment. There are 18 the Mini Nutritional Assessment (MNA) items grouped in four parts: anthropometric assessment (weight, height, and weight loss); general assessment (lifestyle, drug use, and mobility); evaluation of diet (amount of food, food and fluid intake, and feeding autonomy); and subjective assessment (self-perception of health and nutritional status).

Malnutrition in old age will become a more complex problem in the physical and psychological advanced age. However, researchers only want to see what factors impact on elderly seen from questionnaire MNA in nursing homes.

As a result, due to several malnutrition tests in the elderly, the current study was conducted to analyze the malnutrition factors with MNA. As a basis for state policy and the effectiveness of future interventions. Therefore, the present study aims to develop and evaluate MNA from instruments used to determine the most dominant factors in cases of elderly malnutrition

**MATERIAL AND METHOD**

This research is a Factor Analysis study to determine the factors that have the most impact on the case. Factor analysis (FA) is a multivariate method and can use as an extension of the primary component analysis. The primary purpose of the FA is to describe the relationship between a set of variables that observed with a small number of unobservable variables called factors. The research community, both in the quantitative phase, included those in the Mojopahit nursing home in Mojokerto, East Java, Indonesia 2018. The research sample was older adults in nursing homes. The participants gave their informed verbal approval. Inclusion criteria are elderly, not those who experience total communication disruption and bed rest.

The exclusion criteria were refusing to continue the interview. To find out assessing nutritional status as part of an evaluation of the standard of elderly patients in clinics, nursing homes, hospitals, or among those who were evaluated for nutritional status, weak and fast, MNA was validated and developed jointly by the Internal Medicine Center and Clinical Gerontology of Toulouse (France), Clinical Nutrition Program at the University of New Mexico (United States), and the Nestle Research Center in Lausanne (Switzerland).
The data collection process, researchers, used MNA which is complete in less than 15 minutes. Each response point has a numerical value and contributes to the score, which has a maximum value of 30. In people with advanced age with cognitive impairment, the test requires help from families from old age or the health nursing team. Older adults interviewed are classified into three nutritional levels based on a score between 0 and 30. A score of 24 or higher means satisfying nutritional status; a score of 17 to 23.5 means the risk of malnutrition; scores below 17 conclude protein-energy malnutrition. Guidelines for determining height according to knee height and body mass index (BMI) for all patients are included to facilitate using the tool. MNA is easier to manage, patient-friendly, inexpensive (no laboratory tests required), susceptible (96%) and specific (98%) and reproduced.\(^\text{17-20}\)

Interviews are written carefully according to the questionnaire and then analyzed in the shortest time possible or approximately 15 minutes. Interview analysis is carried out by 2 participants (member checking) and 3 teaching staff members or researchers (external verification). In the third step, each questionnaire point is determined and entered by guiding the results of the interview and literature review. In this study, the first inductive and deductive method used. Data were analyzed using SPSS 25.0 software. Data from questionnaires that have completed and then tabulated, 27 elderly are asked to comment on this instrument, and then an examination is carried out by the MNA questionnaire examined. The classified data will proceed to the data analysis process (factor analysis). The factors that have known the results will be adjusted in value with other factors so that the dominant factor obtained.

To determine that 2 research members can carry out an assessment correctly, the principal researcher conducts a common perception in data retrieval, so that there will be no errors during the field assessment. The time used in this perception equation is 1 day in the campus class. The stages that are carried out are pre and post-test understanding of MNA instruments. in the event of any misunderstanding, it carried out until the member can carry out field assessments.

MNA only shows malnutrition in humans and here in parents. If the total score is > 23.5, 17-23.5, < 17, it means that there is no malnutrition, the risk of malnutrition, or malnutrition, respectively.\(^\text{21}\) MNA was validated to determine mal-nutrition for Turkish geriatric patients in 2015.\(^\text{22}\) The calculate body mass index, height measured to centimeters (cm), and body weight weighed to half a kilogram (kg) with the same measuring instrument. MNA is performed in all respondents or the elderly even if their MNA-Short Form (SF) scores ≥ 12.

The structure evaluation of the questionnaire factor, exploratory factor analysis was applied. To answer this question “whether the measurement scale for malnutrition in the elderly with several factors or not,” we use factor analysis that directly uses SPSS 25.0.

The final step includes determining the reliability of the questionnaire with internal consistency. KMO and Bartlett’s Test calculated for the sig level. Research. The current article with the Code of Ethics STIKes.PPNI. LPPM.1316.13 approved at the Community Service Research Institute of Institute of Health Science Bina Sehat PPNI.

**FINDINGS**

Panti Werdha Mojopahit is a technical implementation unit of the Health and Social Welfare Office of the Mojokerto Regional Government that provides services to all people, especially those who are disadvantaged. Socially, this institution provides services to the elderly. In this place the elderly get love, physical and spiritual care, so they can enjoy their old days and get inner and inner peace. This Nursing Home located on Jl Raya Brangkal No. 862 (Front of Sooko Police Station), District Sooko Kab. Mojokerto Postal Code: 61361 Tlfn: (0321) 328894. The northern part of the nursing home located not far from the Kedungmaling market. The south of this institution adjacent to the Masjid Raya Desa Gemekan, Sooko District, Hospital and DIAN HUSADA, Sooko sub-district health center which has the advantage for 47 health services, and dealing with the Sooko District Police Station and the Sooko sub-district office in Mojokerto Regency and the location of this nursing home is right on the side of the inter-provincial highway, with the busy streets of both private and public vehicles.
Table 1: KMO and Bartlett’s Test

<table>
<thead>
<tr>
<th>KMO and Bartlett’s Test</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</td>
<td>.504</td>
</tr>
<tr>
<td>Bartlett’s Test of Sphericity</td>
<td></td>
</tr>
<tr>
<td>Approx. Chi-Square</td>
<td>14.053</td>
</tr>
<tr>
<td>df</td>
<td>15</td>
</tr>
<tr>
<td>Sig.</td>
<td>.522</td>
</tr>
</tbody>
</table>

The above results, it can be said that the variables and samples used to allow for further analysis. This evidence by the KMO value of 0.504 which means higher than 0.5.

After the sig level. It is known and can be continued to determine what factors I influence that can be seen in the table as follows, determining variables to certain factors follows the magnitude of the correlation between variables with coefficients, namely to the significant relationship. It saw table 2.

Table 2. Rotated Component Matrix

<table>
<thead>
<tr>
<th>Rotated Component Matrix</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
<td>1</td>
</tr>
<tr>
<td>Penurunan Asupan makanan</td>
<td>.116</td>
</tr>
<tr>
<td>Penurunan berat badan</td>
<td>.338</td>
</tr>
<tr>
<td>Mobilitas</td>
<td>.674</td>
</tr>
<tr>
<td>Stress</td>
<td>.246</td>
</tr>
<tr>
<td>Neuropsiko</td>
<td>.170</td>
</tr>
<tr>
<td>IMT</td>
<td>.889</td>
</tr>
</tbody>
</table>

| Extraction Method: | Principal Component Analysis. |
| Rotation Method: | Varimax with Kaiser Normalization. |
| a. Rotation converged in 5 iterations. |

Determination of variables to certain factors follows the magnitude of the correlation between variables with coefficients, namely to the significant association. It was the conclusion of the table. 2 then the member factors and variables are:

1. First factor:
   a. Mobility
   b. Body Period Index
   c. Body Period Index

2. Second Factor:
   a. Weight loss
   b. Mobility
   c. Body Period Index

3. Third Factor:
   a. Neuropsychological
   b. Mobility
   c. Body Period Index

DISCUSSION

The first factor consists of activities that must be done by the elderly and body mass index; this means that the elderly and controlling the elderly interpreted as more elderly. The second factor is almost the same as the monitoring of body mass index, and the third factor is the aging process itself which is experiencing neuropsychological disorders. In conclusion, the factors that affect malnutrition among elderly people at Mojopahit Mojokerto nursing home can be described as follows:

Informal factors for the elderly: mobility, neuropsychological disorders

External factors: control nurses about elderly body weight

CONCLUSION

Nutritional status assessment with Mini Nutritional Assessment (MNA) is a multiparameter in screening as well as field assessments of malnutrition in the elderly. This MNA questionnaire consists of 18 questions divided into 4 domains: evaluation for anthropometry, evaluation for food intake, general evaluation of old lifestyle and subjective assessment of advanced age. MNA scores are reliable and can be relied upon to detect the risk of malnutrition in the elderly. In conclusion, using this MNA to look at the factors that cause starvation is better than malnutrition in the elderly. there are 2 malnutrition factors in the Mojopahit Mojokerto nursing home, namely informal elements of the elderly: mobility, neuropsychological disorders, and external factors: controlling nurses about elderly body weight

Acknowledgement: This article was written based on a research project funded by Institute of Health Science Bina Sehat PPNI Mojokerto, East Java, Indonesia. The authors wish to appreciate the Panti Wherda staff and the Department research of Institute of Health Science Bina Sehat PPNI Mojokerto for the project budget and all the
elderly for their participation in this study.

Conflict Interest: None declared

Source of Funding: self-funding

Ethical Clearance: None

REFERENCES


The Development of the Vestibular Stability in Children Who are Engaged in Football Taking into Account their Nervous System

Georgy G Polevoy

Department of Physical Education, Faculty of Physical Culture and Sports, The Vyatka State University, Kirov, Russia

ABSTRACT

In this study, we investigated the effect of typological peculiarities of manifestations of properties of the nervous system of young football players the ability to accurately and consistently perform motor actions in conditions of vestibular irritation. 32 young football players of 10-11 years participated in the pedagogical experiment. 16 athletes were engaged in experimental methodic which is based on using the same exercise and methods development of the ability to react quickly, but different components of the load, for players with a strong nervous system (8 people), the load was intensive, but for players with a weak nervous system (8 persons) - volumetric load. The other 16 football players made up the control group. For 8 months of the experiment there was a significant increase in the ability to react quickly football players 10-11 years old in the experimental group, which was engaged in by a special methodic. The football players with a strong nervous system indicator has improved from 10.1±0.6 time to 12.0±0.4 time (P<0.05), and football players with a weak nervous system – from 9.1±0.3 time to 10.1±0.4 time (P<0.05). In the control group also occurred the positive, but not significant changes (P> 0.05). The study proved the effectiveness of the use of the typological properties of the nervous system as a differentiated method of developing the ability to ability to accurately and consistently perform motor actions in conditions of vestibular irritation of young football players. This approach allows to improve the quality of the training process of young football players.

Keywords: Typology, Vestibular stability, Football players, Differentiated approach.

INTRODUCTION

Football is the most popular sport in all the world. Football is played at different levels, amateur and professional. Football is played by men, women and children. In order to become a great football player must be persistently engaged from childhood. The general level of training of a football player consists of such types of training as his technical training, physical training, theoretical knowledge, tactical thinking and some other types of training.

One of the most important types of training for a football player, especially at a young age, is his technical level of preparation. Technical training of an athlete, a football player is a level of coordination abilities.

Each sport has its own characteristics. However, it is the specific coordination abilities that make up the technical training of the athlete. While General coordination abilities are the Foundation for the development of specific abilities.

In the modern literature there are a number of classifications of specific coordination abilities, one of the most popular classifications is the classification proposed by Hirtz and Lyakh. One of the most important abilities the authors distinguish is vestibular stability.

Age 10-11 years is the most favorable for the development of children’s ability to One of the most important abilities the authors distinguish is vestibular irritation.
The game of the football players is carried out in the constantly emerging unexpected situations, which require the manifestation of the speed of reaction, the ability to concentrate and switch attention, space-time accuracy. It is necessary to have the ability to accurately and consistently perform motor actions in conditions of vestibular irritations.

In order to fully reveal and realize the athlete’s ability to use an individual approach to training activities. In children’s and youth sports, as a rule, this approach is called differentiated. That is, during the training session, children are divided into groups, taking into account some criterion, for example, in terms of technical training, physical development, growth, physical training and some others.

Criteria for dividing players into groups can be very diverse. However, in our opinion, it is necessary to rely on the typological features of the manifestation of the properties of the nervous system, that is, the strength-weakness indicators of the nervous system in the process of excitation. This is a new and poorly understood approach in the training activity of athletes. The use of typology in the training process was studied on athletes - in sprint track and field athletes, basketball, gymnastics, table tennis.

In all the studies listed above, the effectiveness of the typological criterion was proved. At the same time, we were unable to find studies on football players, the preparation of which is carried out based on the difference in the properties of the nervous system (strength and weakness of the excitation process).

The aim of the study is to improve the technical training of football players, using a differentiated approach based on typological features of the manifestation of the properties of the nervous system due to the development of the ability to accurately and consistently perform motor actions in conditions of vestibular irritation.

MATERIAL AND METHOD

The study used empirical and theoretical methods.

1. Theoretical methods - the study of materials on the problem being studied, the study of the training system for young athletes involved in football, analysis of literary sources.

2. Empirical methods:

a) Basic pedagogical experiment - determination of the strength of the nervous system, determination of the level of development of the ability to vestibular stability;

b) Mathematical and statistical methods.

Criteria for evaluating the effectiveness of the methodic

The nervous system of players was determined by the method of “Tapping-test”. Sheet A4 is divided into six arranged three in a row of equal squares, according to the signal, the players begin to put dots in each rectangle. 5 seconds of work in each square. The work is the rapid putting points in the square. You can move from one rectangle to another by command only. After the sixth rectangle the exercise ends. Result - count the number of points in each rectangle, build a work schedule. The type of nervous system is determined according to the schedule.

The ability to balance was evaluated in “turns on the gymnastic bench”.

In total, 32 football players of 10-11 years took part in the experiment. Prior to the experiment, the players were divided into KG and EG by random sampling. Each group had the same number of players with a strong and weak nervous system of the process of excitation.

During the training year, the CG players were engaged in the standard program, and the players in the EG were engaged in an experimental methodic. In football training in EG, a differentiated approach based on the typology of the nervous system was used. During the experiment, 130 training sessions were conducted for 90 minutes each training session.

Mathematical and statistical processing of the
experimental results was carried out using the parametric criterion (t-student)\textsuperscript{21,27}, used by Microsoft Excel 2007. Correlation analysis was performed using the Bio Stat 2009 program. The result was significant at a value of P> 0.05.

Feature of training in EG:

1. After a short warm-up, the football players of the EG performed exercises for 20 minutes on the development of vestibular stability in different subgroups strong and weak nervous system:

1) a Series of 6-10 jumps on the site with turns left and right, performed by different schemes: a) left 90 degrees + 90 degrees (the amount of turns can be varied within 45-360 degrees); b) the same right; C) 90 degrees left + 90 degrees right (such as “turn-turn”).

2) Jumping on the spot and moving forward or backward with a turn of 540-720 degrees.

3) Run with turn (signal) for 180-360 degrees.

4) Running with rotation left and right and other exercises\textsuperscript{18,29}.

2. The main methods of developing the reaction were repeated, varied and playing methods\textsuperscript{9,15}.

3. The main methodical admission were - the introduction of new exercises or the complication of old exercises, changing the speed of the exercise and the introduction of new targets\textsuperscript{9,15}.

4. The main difference in the training of football players with a strong and weak nervous system were the load components. The load for players with a strong nervous system was intense, and for players with a weak nervous system - a voluminous load.

The intensity of the load increased by increasing the number of exercises and reducing rest, and the volume increased due to the increase in the number of repetitions and rest intervals.

The intensity of the exercise is 150-170 beats per minute. The duration of the exercise for football players with a strong nervous system 20-30 seconds, for weak 30-40 seconds. The rest-time - until complete recovery; the character of the rest-time passive.

RESULTS

At the beginning of the study groups and subgroups were formed. Then, between EG and KG was played a friendly match. This match showed an objective level of possession of the technical skills of young football players. The meeting ended with a score of 1-1. Before the beginning of the pedagogical experiment, all football players passed a control test “turns on the gymnastic bench”, which shows the level of development of the vestibular stability. There were no significant and significant differences between the indices of soccer players of CG and EG and within the groups (P> 0.05).

<table>
<thead>
<tr>
<th>Indicators</th>
<th>KG</th>
<th>EG</th>
<th>P (2-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>After&lt;br&gt;Strong</td>
<td>10,1±0,6</td>
<td>12,0±0,4</td>
</tr>
<tr>
<td></td>
<td>P&lt;0,01</td>
<td>9,9±0,4</td>
<td>10,2±0,4</td>
</tr>
<tr>
<td>Weak</td>
<td>9,1±0,3</td>
<td>10,1±0,4</td>
<td>t=2,20</td>
</tr>
<tr>
<td></td>
<td>P&lt;0,05</td>
<td>9,4±0,6</td>
<td>9,6±0,6</td>
</tr>
<tr>
<td></td>
<td>P&lt;0,05</td>
<td>7</td>
<td>t=0,78</td>
</tr>
</tbody>
</table>

The results in the test “Stop rolling the ball with a foot” (from 9.1 to 10.1 time) correspond to the average level of development of the ability to accurately and consistently perform motor actions in conditions of vestibular irritation\textsuperscript{18}.

Indicators of the ability to vestibular stability to football players 10-11 are presented in Table 1.

After the experiment was over, positive changes occurred in the test “turns on the gymnastic bench”.

Table 1. Indicators of the ability to vestibular stability of football players 10-11 years old (M±m)
In KG in football players with a weak and weak nervous system, the indicators improved, but not significantly (P> 0.05).

In football players of the EG with a strong nervous system, the indices improved from 10.1±0.6 to 12.0±0.4 time (P <0.01), and for players with weak nervous system - from 9.1±0.3 up to 10.1±0.4 time (P <0.05). Such indicators correspond to a high level of development of the ability to accurately and consistently perform motor actions in conditions of vestibular irritation for the age of 10-11 years.18

After the end of the pedagogical experiment of the boys’ team, the EG and KG again played a friendly match among themselves. The game ended with a confident victory of football players EG with a score of 5-0. In the game, the guys from EG looked much faster, agile and more technically than the football players from the KG. Such a result allows us to judge the effectiveness of the method.

DISCUSSION

In different sports, General and specific coordination abilities are very important, especially in team sports such as football. For football players, one of the most important specific coordination abilities is the ability to vestibular stability4,7,10. Vestibular stability-the ability to accurately and consistently perform motor actions in conditions of vestibular irritation (somersaults, throws, turns)11,20,26.

In training work with athletes, especially with children, an individual or differentiated approach is very important. It allows the effective use of hidden functionality and physical reserves of the body1,3,13.

When using a differentiated approach, there may be different criteria, such as the growth of a player, his technical training and some other criteria. One of the effective criteria for dividing athletes into groups is the type of nervous system in the process of excitation12,14,16,19,25.

To date, there are methodic in which tools and methods, the components of the load that are aimed at developing the abilities of athletes with different types nervous system are briefly described. In our methodic, for the first time in detail, we specified all the parameters of the means, methods and components of the load when performing physical exercises for athletes 10-11 years, involved in football.

It is important to understand that athletes with a strong nervous system better tolerate the load - intensive. Athletes with a weak nervous system work better with a volume load12,14,16,19,25. In our study, this theory is fully confirmed.

In the course of the experiment, new results were obtained and specific recommendations were given on working with young football players 10-11 years old, who have different types of the nervous system.

CONCLUSION

The experimental methodic of differentiated development of the ability to vestibular stability in football players aged 10-11 with different types of nervous system had a positive and progressive impact on soccer players EG (P <0.01).

In terms of football players in the KG, who were engaged in the standard methodic, the results of the ability to accurately and consistently perform motor actions in conditions of vestibular irritation also improved, but not significantly (P> 0.01).

The victory of the EG over the KG with a score of 5-0 indicates that the football players of the EG surpassed the players of the CG in all respects, including technical training.

Conflicts of Interest - The author declare that hi have no conflict of interest.

Ethical approval - All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Source of Funding – Self

REFERENCES


Patterns of Mortality Caused by Natural Disasters and Human Development Level: A South Asian Analysis

Masum Billah¹, Pedro Arcos González², Rafael Castro Delgado²

¹Lecturer, Department of Sociology, East West University. A/2 Jahurul Islam Avenue, Jahurul Islam City, Aftabnagar, Dhaka, Bangladesh, ²Unit for Research in Emergency and Disasters, Department of Medicine, University of Oviedo, Oviedo, Spain

ABSTRACT

This study aimed at exploring the correlation between the patterns of mortality and affected people caused by natural disasters and human development level at country level in South East Asia (SEA). The study utilized quantitative data on deaths and affected people caused by natural disasters from CRED and other databases. Huge deaths and affected people concentrated on lower HDI countries in comparison with middle ones in SEA. Desegregated disaster subtypes, overlapping data, no universal scale about severity and magnitude measurement demonstrated lead barriers for conducting statistical test between impact variables and development level with value. With the combination of all parameters of natural disaster scales, a universal and accepted scale might be suggested to avoid misleading in disaster data collection and thereby develop scientific techniques for vulnerability assessment.

Keywords: Natural disaster; Mortality; Affected people; South East Asia; Human development level

INTRODUCTION

Large scale natural disasters have demonstrated unprecedented deaths and affected people based on severity and magnitude for the past decades around the world. Though natural hazards are connected with geographical fault lines, climatic shifts and meteorological extreme events, decrease in widespread deaths and affected people largely depends on country specific health system, existing logistics, coping strategies and human development level. Globally, 4000 massive natural disasters had been accounted for estimating 1.5 million deaths during 2005-2015. Several studies on natural disasters related mass causality and affected people have often turned into hazard and event specific disasters in the global settings.¹ Existing disaster documents reveal that there is a great gap of adequate information on country specific mortality and affected people caused by hydro-meteorological and geophysical disasters and its relation with human development value.² Disaster management logistics and preparedness initiatives have carried conviction for few people in low resource settings. In high income settings, people’s exposure to deaths and affected people accounts for estimating lower rates due to strong disaster policy, existing coping resources. SEA is one of the most disaster-prone regions in the world. Geologically, the subcontinent is situated in the active tectonic plate movements in the India Ocean, which have been the source of major earthquakes and tsunamis. Climatic variability, tropical monsoons, and proximity to the coastlines are the direct risk factors for generating tropical cyclones and storms in the Indian Ocean.³

Natural disasters pose for occurring sudden or slow onset furious impacts with atmospheric, hydrologic and geologic roots.⁴ Around five million deaths and millions more injuries worldwide are the direct consequences of disasters since 1960. Most of the deaths have concentrated in developing countries. As a single disaster, drought has killed over 2.5 million people
while earthquakes caused 1 million more fatalities. Furthermore, storms and cyclone claimed over 750,000 deaths during the last decades. Over the past twenty years, more than 50% of all fatalities were reported in low human development countries though they shared only a tenth of those exposed to natural disasters. Subsequently, around 85% of the people exposed to natural disasters are the inhabitants of medium and low human development countries. Deaths are the direct result of sudden onset natural catastrophe while affected is an aggregated figure of all injured, homeless and affected during the period of disaster. The HDI refers to the geometric mean of normalized indices for three dimensions separately. As a dimension of health for HDI, life expectancy has observed a disproportionate increase over the past quarter century. Education and standard of living, based on mean of years of schooling and per capita income respectively are attributed to promise improved socio-economic status through increasing livelihood capacities, housing in low risk areas, expensive disaster insurance and adequate access to warning and evacuation information system. The overall objective of the study is to explore the patterns of mortality and affected people caused by natural disasters and their relationship to the level of human development at country level in SEA.

MATERIALS AND METHOD

The study approached a content analysis of academic research articles, conference papers and scientific documents based on mortality and affected people caused by natural disasters in the duration of 2014-2015. This study employed quantitative method of data collection. Deaths and affected data had been primarily collected from CRED database (EM-DAT). For measuring the severity and magnitude of each disaster, the study also used quantitative data from Relief web, OCHA, UNDP, Flood list, Wikipedia and different media sources. The researcher checked and rechecked data repeatedly from multiple sources for verifying the validity.

Concentrating on multiple scales for measuring magnitude level, a general scale valued 1 to 5 had been adopted for combining original disaster magnitude levels into a standardized benchmark. This piece of work utilized human development value from UNDP country reports and correlated impact variables caused by disasters for the duration of 2014-2015. The duration of data collection took two months, May to June, 2016. The collected data had been analyzed by using descriptive statistics in SPSS version 20. Multi variate analysis was administered for correlating impact variables caused by natural disasters with the value of country specific human development index.

RESULTS

<table>
<thead>
<tr>
<th>Disasters</th>
<th>Frequency</th>
<th>Deaths</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthquake</td>
<td>13</td>
<td>9457</td>
<td>52.84</td>
</tr>
<tr>
<td>Extreme temperature</td>
<td>6</td>
<td>3796</td>
<td>21.21</td>
</tr>
<tr>
<td>Flood</td>
<td>40</td>
<td>3160</td>
<td>17.66</td>
</tr>
<tr>
<td>Landslide</td>
<td>15</td>
<td>997</td>
<td>5.57</td>
</tr>
<tr>
<td>Storm</td>
<td>17</td>
<td>483</td>
<td>2.70</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>92</strong></td>
<td><strong>17,897</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

The table 1 shows that there was no relation between number of disaster episodes and number of deaths occurred in SEA. Out of 92 natural disasters recorded, approximately 53% deaths occurred due to earthquakes while 21.21% fatalities occurred due to extreme temperature in the past two years. More frequency of disaster episodes does not demonstrate incidence of deaths higher or lower in the current study. In the study, 17.66%, 5.57% and 2.70% deaths were reported from flood, landslide and storm respectively.

Patterns of Mortality and Affected People and HDI

![Diagram of Dispersión (Y Predicha, DEATHS vs. HDI)](image)

**Figure 1: Number of deaths and HDI**

The figure 1 shows that over 60 deaths were reported for HDI 0.47 in Afghanistan while around 40-0
deaths were noted for HDI 0.61 in India and Bhutan respectively. The number of deaths lowered when the value of HDI showed an increase in the line graph data. It was observed that deaths caused by natural disasters had a positive correlation with the level of human development for each country. It was an inverse or indirect correlation between deaths and HDI variables. This relationship was considered statistically significant in the study. So, it was clearly found that deaths caused by natural disasters followed a positive correlation with the value of human development for each specific country.

**Flood occurred mortality and HDI level**

In the case of floods, there was also an inverse correlation between the value of human development index and the number of deaths and this correlation was shown as statistically significant.

![Diagram](image)

**Figure 2: Deaths caused by flood and HDI**

With regard to explaining deaths caused by flood during 2014-2015, it was clearly found that nearly 450 deaths were identified for lowest HDI 0.47 while less than 50 deaths were reported for the highest HDI 0.77 in the study line graph 2. The study data on flood demonstrated that deaths followed an inverse statistical relationship with the level of HDI in quantitative study.

**Storm induced deaths and HDI value**

![Diagram](image)

**Figure 3: Correlation between deaths and HDI**

In the graph 3, it was clearly noted that over 80 deaths caused by storms were identified for HDI score 0.55 of Nepal while around 60 deaths caused by storms were reported for HDI value 0.47 of Afghanistan in the study. Most of the reported deaths caused by storms followed a slight declination for higher HDI countries in the figure. In addition, more deaths caused by storms demonstrated for lower HDI values in comparison with higher ones in the study. The relationship between variables was negative or indirect but reported as statistically significant.

**Correlation of Mortality based on Standardized Magnitude (SM) and HDI**

![Diagram](image)

**Figure 4: Deaths of SM 1 and HDI**

Overall, it was found that over 60 deaths caused by disasters of magnitude one were reported for low HDI score 0.47 in Afghanistan focused in the graph 4. The number of deaths of magnitude one declined sharply following higher HDI value in the study. It was an indirect or negative correlation between deaths caused by disasters and HDI level. It was considered as statistically significant in the study.

![Diagram](image)

**Figure 5: Deaths of SM 3 and HDI**

In case of disaster magnitude 3, approximately 450 deaths were noted for lowest HDI value 0.47 in Afghanistan while around 5 deaths were reported for highest HDI values in Iran and Sri Lanka respectively (Figure 5).
DISCUSSION

Mortality Trends and Human Development Level

The SEA has experienced large scale disasters and widespread deaths and affected in the past couple of years. The frequency and destructiveness of natural hazards have found a considerable increase during the last 30 years. Likewise, in comparison with disaster impacts in 2014, a higher proportion in deaths and affected people caused by natural disasters was found in 2015. Overlapping in data records, misleading in database records and multiple characters of similar natural disasters usually limit higher statistical analysis to connect disaster impact factors with development variables. In World Health Organization’s estimation, statistics of death and affected people vary widely due to technical challenges. Limited resources for collecting and compiling disaster related data, inadequate vital registration system, political biases and misleading in reporting were noted as the challenging barriers for reporting country wise natural disaster data.

The number of deaths caused by flood, earthquake and storm were found to be statistically correlated with country specific HDI value. The relationship was indirect or negative and found statistically significant. Exposure to disasters and deaths caused by natural disasters concentrated a lot on low human development countries while more impact factors concentrate in middle human development countries in comparison with that from high human development countries. Bangladesh and the United States experienced tropical cyclone 3.4 times and 12.1 times respectively, resulting consecutive deaths of 7,468 and 223 people on average per year during the twenty years 1980-2000. Landslide and extreme temperature did not find any correlation with the value of human development.

Flooding showed a significant correlation with the level of human development for country specific profile. India, a middle HDI country has experienced a fairly proportion of flood related impact factors in the past years. With the highest frequency and magnitude, deaths and affected people caused by flooding undoubtedly concentrated on the level of development. But, the correlation between level of development and impact factors were focused as inverse or indirect statistically. In case of earthquake, the findings reveal that the correlation between deaths and affected people caused by earthquake as well as structural factors becomes apparent more rather than the level of human development value. Most of earthquakes concentrated on low middle human development countries like Nepal, Afghanistan, Pakistan and India and caused large scale deaths and injuries across the region. However, the yearly approximate 250 deaths were noted from storm, in the past couple of years. Another regional study finding from SEA reveals the different results. The yearly average deaths from storm were reported approximately 2000 during the periods 2010-2014 [3].

Human Development Level and Affected from Disasters

The correlation between human development level and affected people from flood, earthquake and landslide respectively was considered indirect or inverse. It was not statistically significant relationship. In addition, no correlation was found between HDI level and affected people from storm. The most affected people from natural disasters were found for middle HDI in India during the past two years 2014-2015. Flood, the frequently occurred event in India made a significant difference with all other disaster affected people for SEA countries. It was a bit confusing to correlate all the data from affected people with development level. Limitation of data on affected people from different natural disasters had been the great barrier for correlating with development level for country specific explanation. The most obvious finding showed that affected people from natural disasters appear mostly in middle HDI countries in SEA context.

Correlation between Deaths and Affected People

Deaths caused by natural disasters demonstrated a direct or positive correlation with affected population in the past couple of years. When deaths from natural disasters find an increase, the number of affected people also finds a positive increase in the same direction. These findings are quite similar with the statistical results of yearbook 2011. Between 1991-2000 and 2001-2010, around 10 and 60 deaths per million people respectively were reported in comparison with 21 and 22 affected people per thousand people respectively from natural disasters in SEA. Overall, the higher the number of deaths reported in natural disaster situations, the largest the number of affected people appeared in the database.
HDI Value and Mortality Analysis

In SEA, countries with lower HDI value experiences more deaths caused by natural disasters of lower magnitude in comparison with countries with higher HDI value. The number of deaths caused by natural disasters demonstrated comparatively higher in Afghanistan, Pakistan, Nepal, and Bangladesh in comparison with other countries in SEA in the periods 2014-2015. The correlation of deaths caused by disaster magnitude 3 with HDI value was approached negatively in the study. However, majority of deaths of disaster magnitude 3 occurred in lower HDI countries like Afghanistan, Pakistan, Nepal and Bangladesh for the past two years. Conversely, higher HDI countries Iran, Sri Lanka, Maldives, Bhutan and India experienced lower deaths for disaster magnitude 3 in the same periods. The inverse relationship was indirect and statistically significant. On the basis of standardized magnitude 2 and 4, it was noted that there was correlation between the variables. It was an indirect or negative correlation. It was not statistically significant. Fatalities from earthquake 2015 in Nepal made a considerable difference for showing more significant relationship between human development value and deaths.

CONCLUSION

SEA countries continue to experience disproportionate impacts of natural disasters. Most of the deaths from natural disasters concentrated on low human development countries like Afghanistan, Nepal, Pakistan and Bangladesh in comparison with fatalities from other middle human development countries in SEA. Disaster affected people dominated in middle HDI countries in comparison with that from low HDI backgrounds. Limitation of data on affected people, overlapped disaster data among disaster subtypes, misleading in reporting in database, and misreporting in newspapers and journals demonstrated perceived barriers for considering statistical significant and positive correlation between impact variables and HDI level. Considering different disaster indicators for measuring severity and magnitude, a universal and well accepted scale for aggregating large scale disaster data and framing benchmark might be suggested for avoiding misleading in disaster data collection and developing scientific tools for vulnerability estimation.

Financial Disclosure: None declared

Ethical Clearance: The study was dependent on recorded data from EM-DAT database as per institutional rules. So, the study did not look for any individual consent. But, it took officially recognized institutional permission for using their reserved dataset.

REFERENCES

[1] Songer T, The Epidemiology of Natural Hazards, PhD Dissertation, Department of Epidemiology, Graduate School of Public Health, University of Pittsburgh, Pennsylvania, USA

Conflict of Interest: None declared
Isolation and Identification of the Fungi Associated with Mosquitos and Utilizing their Filtrates in the Biocontrol of *Culex molestus* Forskal

Maysaa Taqi Al-Khazali¹, Sarah Kadhim Al-Rahimy¹, Aseel Kariem Alsultany¹, Hawraa Hasan Atiyah¹
¹Department of Biology, College of Science, University of Kerbala

**ABSTRACT**

The following study included the isolation and identification of the fungi associated with the adult mosquito spread out throughout the Kerbala Governorate, Iraq. A total of 94 samples were collected from different areas. Of these samples 69 fungi were isolated and laboratory identified to belong to 6 genera. *Aspergillus* spp. scored the highest rate reaching 56.5%, whereas *Trichoderma viride* scored the least rate of 2.8%. Three species of the *Aspergillus* were isolated and identified, where the *A. niger* was the more frequent as its rate was 44.9%. The two neighbourhoods of Towayreg and Alhussainiya recorded the highest rate up to 24.6% and 20.2% respectively. As regards the effect of the isolated fungal filtrates on the percent of mortality of the adult of *Culex molestus*, the results also explained the superiority of *A. flavus* filtrates by spray and feeding the adults with food containing that filtrates where the mortality percent reached 72.97% and 70.83% respectively. The concentration 100% of the fungal filtrates resulted in the highest mortality rate up to 100% after 96 hours of the treatment.

**Key words**: *A. flavus*, *A. niger*, *Culex molestus* Forskal.

**INTRODUCTION**

Mosquitos are considered blood-sucking arthropods which belong to the order Diptera of the family Culicidae which is of great importance both in the medical and veterinary fields because they are a bio vector for several dangerous pathogenic pests, and are the most prevalent among human environment. Due to the medical importance of mosquitos, scientists were interested in combating both them and the damages resulting from utilizing chemical pesticides suffered by the environment, humans and the non targeted organisms, thus the need arose to use bio control where the fungi were utilized in insect control as they have the ability to infect nearly 200 types of insects which belong to order of Coeloptera and Lepidoptera, whereby fungi act as insect pathogens through contact, producing spores that attach to the insect’s body and dissolve the proteins, chitin and fat incorporated in the insects body.

In view of the lack of previous studies concerning the isolation and identification of the fungi accompanying the mosquitos spread out in the Kerbala Governorate, this study aims at: Isolation and identification of the fungi associated with the mosquitos spread in different areas in Kerbala Governorate, Testing the efficiency of various concentrations of filtrates in affecting adult *Culex molestus* by utilizing different methods, and Determination of the relation between the effect of the concentration and the period of exposure and their effect on the percent of mortality.

**MATERIAL AND METHOD**

**Collection of samples**

A total of 94 samples were collected from adult mosquitos from different areas of the Kerbala Governorate which are Towayreg, Alhussaineya, districts of Al-Zahraa, Albobyat, qantart Alsalam, Ramadan and the old city center using a specialized insect collection trap. brought to the laboratory and treatment in accordance with then each 5 insects were put in a Petri dish containing Potato dextrose agar added to the
antibiotic Chloramphenicol at a concentration of 250 mg/l, and incubated at 27 °C for an interval of 5-7 days, after which they were examined, the growing fungi isolated and purified on a new growth medium.

Identification of fungi

The isolated fungi were identified according to the standardized method \(^7\), utilizing the categorization key \(^8,9\). The percentile was calculated according to the following equation \(^10\):

\[
\text{Percentile of encounters} = \left( \frac{\text{number of times the fungus is encountered}}{\text{the total number of samples}} \right) \times 100
\]

Preparation of fungal filtrates

A broth potato dextrose agar was prepared according to the standard doctrine \(^11\), it was distributed in 250 ml beakers in the amount 150 ml in each beaker, and the medium was inoculated with discs of the isolated fungal cultures at the age of 7 days, each alone, at a rate of three discs for each beaker. The beakers were incubated at 27 °C and shaken every three days to distribute the fungal growth. After two weeks filtering the inoculations using the Whatman No.1 filter paper using a bechner cone with the assistance of a vacuum pump, the filtration was repeated utilizing the fine filter containing a fine filter paper and then the concentrations were prepared: 25 %, 50 %, 75 %, and 100 % \(^12\).

Collection and identification of mosquito samples

Egg rafts were collected from the Cx. molestus from one of the heavy sewage discharge locations in the district of Ramadan, Kerbala Governorate. The rafts were placed in strict laboratory conditions in order to hatch and were bred until reaching the adult. To confirm the identification process, a biological phenomenon was utilized, namely the ability of this type of females to lay its first raft of eggs without needing a blood meal \(^13\).

Effect of the fungal filtrates on the mortality of the Cx. molestus adult by spraying

The effect of the filtrates on the adult mosquitos was examined at the age of 24 hours after spraying them with the filtrates, where 10 insects were placed in a glass bottle of 250 cm\(^3\). The refined items were sprayed at a rate of 5 ml filtrates / refined, at an amount of three refined items for each concentration using a small sterilized atomizer from an approximate height of 15 cm. As to the control treatment, they were sprayed only with sterilized distilled water. The percent of mortality scored after 48 and 96 hours from treatment were recorded, and the values corrected according to \(^14\).

Effect of the fungal filtrates of some fungi introduced through nutrition on the percent of adult mortality of Cx. molestus

Filtrates of two isolated fungi introduced through nutrition were used and their effect on adult Cx. molestus was tested, where 5 cm\(^3\) of the fungal filtrates of each concentration prepared was mixed with 5 cm\(^3\) of a sugar solution at 10% concentration. The mixture was distributed in sterilized plastic Petri dishes of a diameter of 9 cm, then the dishes were placed in breeding boxes containing 10 adult with three refined items for each fungal filtrates. The percent of mortality were calculated after 48 and 96 hours of treatment \(^14\).

All results were analysed according to the complete randomized factorial design, and calculated by using the Least significant difference at a probability level of 0.05 \(^15\).

RESULTS AND DISCUSSION

In the current study 69 isolates of the fungi were isolated and they were found to belong to 6 genera, the most prevalent percent belonged to the imperfect fungi followed by the cystic ones(table1). The reason for this is that the imperfect fungi produce vast numbers of small sized reproductive units in addition to their ability to spread over extended distances and their ability to form certain structures to resist environments hostile to their growth \(^16\).

Table(1) shows as well that the most frequently encountered fungus was the Aspergillus, where the percent of its encounters was 56.5 % while the least fungi to appear were both Fusarium solani and Trichoderma viride, as the percent of their encounters was 5.7 % and 2.8 %, respectively.

These results were consistent with other studies that indicated the isolation of several fungi from different insects, one of those is \(^10, 17, 18, 19\). As for the types, the same table shows that Aspergillus spp. was diagnosed through three types which are A.niger, the most frequent encountered at 44.9 %, followed by A.flavus at 8.6 %.
, then *A. candidas* at 2.8%. This result contradicts the findings of 18 and 20, 21 stated that the reason of the frequent encounters of *Aspergillus spp.* which exceed the other species is due to the fact that they are one of the widespread fungi abundant in the warm places, in addition to them producing great numbers of spores.

**Table 1. The percent of isolated fungi from adult mosquitos**

<table>
<thead>
<tr>
<th>Percent of encounters %</th>
<th>Number of encounters</th>
<th>The fungus</th>
</tr>
</thead>
<tbody>
<tr>
<td>56.5</td>
<td>39</td>
<td>Aspergillus sp.</td>
</tr>
<tr>
<td>44.9</td>
<td>31</td>
<td><em>A.</em> niger</td>
</tr>
<tr>
<td>8.6</td>
<td>6</td>
<td><em>A.</em> flavus</td>
</tr>
<tr>
<td>2.8</td>
<td>2</td>
<td><em>A. candidus</em></td>
</tr>
<tr>
<td>13.0</td>
<td>9</td>
<td>Penicillium sp</td>
</tr>
<tr>
<td>11.5</td>
<td>8</td>
<td>Candida sp.</td>
</tr>
<tr>
<td>10.1</td>
<td>7</td>
<td><em>A.</em> alternaria</td>
</tr>
<tr>
<td>5.7</td>
<td>4</td>
<td>Fusarium.solani</td>
</tr>
<tr>
<td>2.8</td>
<td>2</td>
<td><em>T.</em> viride</td>
</tr>
</tbody>
</table>

The results of the study also showed significant differences in the percents of encounters of fungi in the samples examined according to the locations (table 2). The highest rate of encounters was also recorded for the areas Altowayreg, Alhussainiya and Albobyat with a significant gap separating them from other areas at rates of 24.6%, 20.2% and 18.8% respectively. The reason for the high rate of them being rural areas with an abundance of gardens and fields, as well as the relatively high humidity rates there due to the presence of rivers and small streams in them.

**Table 2. The effect of the districts studied on the percent of the encounters of the isolated fungi**

<table>
<thead>
<tr>
<th>fungi %</th>
<th>Districts</th>
<th>Fungi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Old city center</td>
<td></td>
</tr>
<tr>
<td>44.9</td>
<td>1.4</td>
<td><em>A. niger</em></td>
</tr>
<tr>
<td></td>
<td>4.3</td>
<td><em>A. flavus</em></td>
</tr>
<tr>
<td>6.0</td>
<td>0</td>
<td><em>A. candidus</em></td>
</tr>
<tr>
<td>2.8</td>
<td>1.4</td>
<td><em>T.</em> viride</td>
</tr>
<tr>
<td>13.0</td>
<td>1.4</td>
<td>Penicillium sp.</td>
</tr>
<tr>
<td>11.5</td>
<td>1.4</td>
<td>Candida sp.</td>
</tr>
<tr>
<td>10.1</td>
<td>0</td>
<td><em>A.</em> alternaria</td>
</tr>
<tr>
<td>5.7</td>
<td>0</td>
<td><em>F.</em> solani</td>
</tr>
<tr>
<td>2.8</td>
<td>1.4</td>
<td><em>T.</em> viride</td>
</tr>
<tr>
<td></td>
<td>5.6</td>
<td>Rate of district effect</td>
</tr>
</tbody>
</table>

For interference = 0.5712 For fungi = 0.2019 For district = 0.2019 L.S.D. 0.05
Table 3 demonstrated the superiority of the fungal filtrate of *A. flavus* with significant differences separating them from the rest of the treatments with a mortality rate reaching 72.97%, and that the concentration 100% showed a perceptible superiority in the mortality rates than the rest of concentrations used, while the fungal filtrate *Candida sp.* produced the least mortality rate at 23.76% in comparison with the rest of the concentrations. The same table showed as well that the interval of 96 hours was the most effective compared to less intervals as the mortality rate in that interval was 88.88% which is significantly different from the rest of the time intervals as confirmed by the results shown in the table itself indicating the significant overlap between the effect of the fungal filtrate and the interval elapsed after the treatment where the greater the increase in the interval of the treatment and the concentration of the filtrates, the more the increase in the mortality rate whatever the different types of fungi. The reason of this disparity between these fungi could be the ability of these fungi to secrete analysed enzymes and fungal toxins which affect the biological activities of the living organisms leading to their demise.

Our current studies confirm with 23 who confirmed that the fungus *B. bassiana* is effective against the adult of *Haematobia irritans* which produced mortality rates of 98.4% after 4 days from treatment and 100% after 7 days from treatment and 24 determined the superiority of the concentration 100% for the fungal filtrate *B. bassiana* to the rest of the other dilutions where the highest mortality rate for the adult of *Cx. pipiensp piens* was 100% during 2 and 4 days, respectively and the least mortality rate was 16.33% and 50.00% during 2 and 4 days respectively.

Table 3. The effect of the fungal filtrates using the spray method in the percent of mortality for the adult mosquito *Cx. molestus*

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Percent of adult mortality after</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>48 hour</td>
<td>96</td>
</tr>
<tr>
<td>Filtrates of fungi</td>
<td>25 50 75 100</td>
<td>25 50 75 100</td>
</tr>
<tr>
<td>A.niger</td>
<td>19.9 41.25 41.42 60.0</td>
<td>35.0 55.5 80.0 100</td>
</tr>
<tr>
<td>A.flavus</td>
<td>28.75 65.0 80.0 90.0</td>
<td>40.0 90.0 90.0 100</td>
</tr>
<tr>
<td>A.candidus</td>
<td>16.11 16.11 41.25 67.5</td>
<td>21.24 48.01 61.5 100</td>
</tr>
<tr>
<td>Penicillium sp</td>
<td>33.33 33.33 45.0 55.5</td>
<td>33.33 45.0 71.43 100</td>
</tr>
<tr>
<td><em>Candida sp</em></td>
<td>16.25 16.25 30.0 36.6</td>
<td>24.25 24.25 37.5 100</td>
</tr>
<tr>
<td>A. alternaria</td>
<td>22.5 45.0 50.0 65.0</td>
<td>29.25 66.66 80.0 100</td>
</tr>
<tr>
<td>F.solani</td>
<td>21.66 33.33 35.0 67.5</td>
<td>33.33 43.57 87.5 100</td>
</tr>
<tr>
<td><em>T. viride</em></td>
<td>10.0 16.25 50.0 90.0</td>
<td>23.33 50.01 68.75 100</td>
</tr>
<tr>
<td>Control</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
<tr>
<td>Average intervals</td>
<td>19.00 29.61 40.85 61.29</td>
<td>26.65 47.01 64.07 88.88</td>
</tr>
<tr>
<td>L.S.D. 0.05</td>
<td>For filtrates = 0.1997</td>
<td>For intervals = 0.1584</td>
</tr>
</tbody>
</table>

For concentrations = 0.1395
Results of table (4) showed that the highest mortality rates increase by the increase of the concentration of the fungal filtrate and the increase of the interval after the treatment, which were 31.67% for the concentration 25% and increased to 47.78% and 95.00% and 100% for the concentrations 50, 75 and 100%, respectively after 96 hours from treatment compared to the mortality rates in the lesser intervals. The effect of these fungi may be due to their ability to produce toxins which affect the insect pests and the mortality rate increases with the increase of its concentration as well as the interval of exposure.

Table 4. The effect of some fungal filtrates using the nutrition method on the percent of mortality for the adult mosquito *Cx. molestus*

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Percent of adult mortality after 48 hour</th>
<th>Percent of adult mortality after 96 hour</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td><em>A. flavus</em></td>
<td>33.33</td>
<td>45.0</td>
<td>80.0</td>
</tr>
<tr>
<td><em>A. alternaria</em></td>
<td>16.33</td>
<td>23.33</td>
<td>50.0</td>
</tr>
<tr>
<td>Control</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Average interval</td>
<td>16.55</td>
<td>22.78</td>
<td>43.33</td>
</tr>
<tr>
<td>L.S.D. 0.05</td>
<td>For filtrate= 0.2566</td>
<td>For interval= 0.5491</td>
<td>For concentration= 0.4222</td>
</tr>
</tbody>
</table>

**Ethical Clearance:** Ethical clearance was obtained from College of Science, University of Karbala Research Ethics Committee.

**Source of Funding:** Self-funded.

**Conflict of Interest:** None

**REFERENCES**

10. ALJaboury, A. N. Isolation and identification of the fungi accompanying some types of Aphid insects...


20. AlJameily, S. N. A. Evaluation of the efficiency of some fungi which accompany the mosquito *Culexquinquefaciatus* in its biocontrol. Master thesis/Kadesiah university


Clinical and Molecular Profile of Patients with Breast Cancer in Tikrit Province

Ali Abbas Ali
Samarra General Hospital, Ministry of Health, Iraq

ABSTRACT

Background: breast cancer is the most frequently diagnosed cancer and the leading cause of cancer death in women, a good description of the patients’ clinical and molecular characteristics is essential to better understanding of the disease.

Patients and method: A retrospective study that included 79 patients diagnosed with breast cancer, the study carried out during the period of 1\textsuperscript{st} January 2014 to 1\textsuperscript{st} December 2015.

The aim of the study: evaluate the patients’ clinical profile and molecular profile for females with breast cancer.

Results: Mean age of the patients was 52.9 ± 10.1 years and the BMI was 28.8 ± 4.7 kg/m\textsuperscript{2}, 73.4% ER positive, 70.9% with PR positive, and 24.1% Her2 positive. T-staging was 13.9%, 57.0%, 25.3% and 3.8% (T1 to T4 respectively) while N-staging was 32.9%, 39.2%, 10.1% and 17.7% (N0 to N3 respectively).

Conclusion: The clinical and molecular profile of Iraqi women patients with breast cancer was similar to reported in the literature, with mean age at diagnosis in the six decade, 73.4% ER positive, 70.9% with PR positive, and 24.1% Her2 positive.

Key words: age, estrogen receptor, progesterone receptor, her2, Iraq

INTRODUCTION

Globally, breast cancer is the most frequently diagnosed cancer and the leading cause of cancer death in women. In the United States, breast cancer is the most commonly diagnosed cancer and the second most common cause of cancer death in women. In addition, breast cancer is the leading cause of death in women ages 40 to 49 years. Breast cancer is treated with a multidisciplinary approach involving surgical oncology, radiation oncology, and medical oncology, which has been associated with a reduction in breast cancer mortality\textsuperscript{1}.

Breast cancer is the commonest cancer in women worldwide\textsuperscript{2}. Its incidence has increased over several decades, while the death rate has fallen because of improved survival\textsuperscript{3}. Survival has probably improved because of a mixture of earlier detection of the disease (both through screening and earlier symptomatic presentation), biological changes that have made the disease more susceptible to hormonal therapy, and improved treatment\textsuperscript{4,5}.

Incidence rates vary from 19.3 per 100,000 women in Eastern Africa to 89.7 per 100,000 women in Western Europe and are high (greater than 80 per 100,000) in developed regions of the world (except Japan) and low (less than 40 per 100,000) in most of the developing regions\textsuperscript{6}. According to the International Agency for Cancer Research and GLOBOCAN 2008, the Age-Standardized Incidence Rates (ASR) in Iraq was (31.1/100,000), similar as compared to the countries surrounding Iraq, Kuwait (47.7), Saudi Arabia (22.4), Jordan (47.0), Syria (23.0), Iran (18.4), Turkey (28.3)\textsuperscript{6}. The current work aimed to evaluate the patients’ clinical profile and molecular profile for females with breast cancer.

METHOD

A retrospective study that included 79 patients diagnosed with breast cancer, the study carried out in Tikrit Teaching Hospital during the period of 1\textsuperscript{st} January...
The patients enrolled in this study were already diagnosed with breast cancer either on adjuvant chemotherapy, hormonal therapy or on regular follow up, all of them were females. The data of all the patients were obtained included the histopathological reports that confirm their diagnosis regarding breast subtypes, grading and staging. Also, immunohistochemical (IHC) reports that confirm their hormonal status (ER, PR, HER2). The patients in this study underwent surgical intervention either by biopsy or mastectomy with axillary clearance, and then the formalin-fixed paraffin-embedded tissue blocks were sent to the hospital laboratory for H&E and IHC. Male patients with breast cancer were exclude from this study.

RESULTS

Mean age of the patients was $52.9 \pm 10.1$ years and the BMI was $28.8 \pm 4.7$ kg/m$^2$, both the molecular and clinical profile and staging are illustrated in table 1 and 2.

Table 1: molecular profile of the patients

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER Status</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>21 (26.6%)</td>
</tr>
<tr>
<td>+1</td>
<td>20 (25.3%)</td>
</tr>
<tr>
<td>+2</td>
<td>24 (30.4%)</td>
</tr>
<tr>
<td>+3</td>
<td>14 (17.7%)</td>
</tr>
<tr>
<td>ER Positive</td>
<td>58 (73.4%)</td>
</tr>
<tr>
<td>PR status</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>23 (29.1%)</td>
</tr>
<tr>
<td>+1</td>
<td>22 (27.8%)</td>
</tr>
<tr>
<td>+2</td>
<td>15 (19.0%)</td>
</tr>
<tr>
<td>+3</td>
<td>19 (24.1%)</td>
</tr>
<tr>
<td>PR positive</td>
<td>56 (70.9%)</td>
</tr>
<tr>
<td>Her2 status</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>37 (46.8%)</td>
</tr>
<tr>
<td>+1</td>
<td>11 (13.9%)</td>
</tr>
<tr>
<td>+2</td>
<td>14 (17.7%)</td>
</tr>
<tr>
<td>+3</td>
<td>17 (21.5%)</td>
</tr>
<tr>
<td>Her2 positive</td>
<td>19 (24.1%)</td>
</tr>
</tbody>
</table>

ER: estrogen receptor, PR: progesterone receptor, HER2: human epidermal growth factor receptor 2
Data presented as number (%)

Table 2: clinical profile and tagging of the patients

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T staging</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>11 (13.9%)</td>
</tr>
<tr>
<td>2</td>
<td>45 (57.0%)</td>
</tr>
<tr>
<td>3</td>
<td>20 (25.3%)</td>
</tr>
<tr>
<td>4</td>
<td>3 (3.8%)</td>
</tr>
<tr>
<td>N staging</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>26 (32.9%)</td>
</tr>
<tr>
<td>1</td>
<td>31 (39.2%)</td>
</tr>
<tr>
<td>2</td>
<td>8 (10.1%)</td>
</tr>
<tr>
<td>3</td>
<td>14 (17.7%)</td>
</tr>
<tr>
<td>Metastasis</td>
<td></td>
</tr>
<tr>
<td>Bone</td>
<td>9 (11.4%)</td>
</tr>
<tr>
<td>Liver</td>
<td>7 (8.9%)</td>
</tr>
<tr>
<td>Lung</td>
<td>6 (7.6%)</td>
</tr>
</tbody>
</table>
Data presented as number (%)

DISCUSSION

In the current study mean age of the patients was $52.9 \pm 10.1$ years, which is in agreement with Kensler et al with mean age $57.1 \pm 10.1$ years 7, and with Hu et al (50 years) 8, but younger that Elebro et al with median 65 years at diagnosis 9, in meta-analysis of 19 studies median age were between 49 – 61 years 10, these studies agree with findings of the current study about age at presentation of breast cancer.

In the current study T-staging was 13.9%, 57.0%,
25.3% and 3.8% (T1 to T4 respectively) while N-staging was 32.9%, 39.2%, 10.1% and 17.7% (N0 to N3 respectively), the following studies reported similar findings in Carreño et al T-stage of the tumor (T1, T2, T3, and T4) was 45.5%, 42.3%, 6.6% and 6.6% respectively, while node positive disease reported in 34.9% \(^{14}\), In Honma et al node positive presented in 186/403 (46.2%) of the cases \(^{11, 15}\), Park et al T-staging was 15.9%, 62.1%, 21.9% (Tis, T1, and T2-3) while N – staging (0 through 3) was 15.6%, 49.2%, 29.9% and 5.3% \(^{12}\), Castellano et al T – staging was 57.7%, 28.3%, 2.7%, and 2.9% \(^{13}\).

In the current study her2+ expressed in 24.1% of the cases, in Honma et al study Her2+ expressed in (5.0%) of the cases \(^{11}\), Park et al 21.9% of the cases expressed Her2+ \(^{12}\), Castellano et al Her2+ in 10.8% \(^{13}\), Hu et al Her2+ in 8.6% \(^{8}\), Kensler et al Her2+ presented in 20.4% \(^{7}\).

**CONCLUSION**

The clinical and molecular profile of Iraqi women patients with breast cancer was similar to reported in the literature, with mean age at diagnosis in the six decade, 73.4% ER positive, 70.9% with PR positive, and 24.1% Her2 positive.

**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 Tikrit Teaching Hospital, department of medicine.

**Source of Funding:** The work were supported by author only

**REFERENCES**


Evaluation of “Sublay” and “Onlay” Mesh Hernioplasty Techniques of Ventral Hernial Repair

Ali Hussein Al-Tai
Department of Maxillofacial Surgery, College of Dentistry, Kerbala University, Iraq

ABSTRACT

Ventral abdominal hernias are common surgical conditions that can be presented as emergency and elective cases. Repairing ventral hernias have always been a huge challenge to the surgeons. Mesh hernioplasty was considered as a gold standard to prevent or minimize the incidence of recurrence, but a question arises where should the mesh sublay or onlay be placed? This research compares the procedures and outcomes of both onlay and sublay techniques in ventral hernia repair. A prospective study of was conducted at the surgical unit of Al-Imam Al-Hussein Medical City on 120 patients submitted for ventral hernias repair. Cases were registered in a year starting from 1st January 2015 to 1st January 2016) and followed up till January 2017. Study population was divided into two groups: 60 patients under group A that included patients who had undergone onlay mesh repair and another 60 patients as group B who were treated with sublay mesh repair. Data collected from both the groups included operation time, placement, and duration needed for drain removal, wound infection, and recurrence rate. Quarterly follow-up for 2 years was performed. Data were analyzed using SPSS 18.0 software; Fisher’s exact test was considered as appropriate for analyzing statistical significance; \( p < 0.05 \) was considered to be statistically significant. The research outcomes indicated postoperative complications such as seroma formation in two patients (3.33%) from the sublay group, whereas 12 (20%) from the onlay group. Wound infection was found in one patient (1.66%) in the sublay group whereas in 6 (10%) patients in the onlay group. No septic mesh was removed in the sublay treated group, whereas one mesh was removed in the onlay type. In the onlay group recurrence was found in 4 patients (6.66%), whereas there was no recurrence in the sublay group. To conclude the sublay mesh hernioplasty is a better alternative to onlay mesh hernioplasty for all forms of ventral hernia cases.

Key words: sublay; onlay; mesh repair; ventral hernia; umbilical hernia.

INTRODUCTION

Protrusion of the abdominal contents through the fascia of the anterior abdominal wall is called a ventral hernia. Such defects are categorized as congenital, spontaneous, or acquired or based on their abdominal wall location. For example, hernias occurring from the xiphoid process to the umbilicus are the epigastric; those at the umbilicus are termed as umbilical; hernias that are highly uncommon and spontaneous hernias that occur in the midline below the umbilicus are paraumbilical and hypogastria hernias. Acquired hernias typically occur after surgical incisions, and are therefore termed incisional hernias. Although not a true hernia, diastasis recti can present as a midline bulge. In such a condition, the linea alba is stretched that leads to bulging at the medial margins of the rectus muscles. Abdominal wall diastasis may occur at other sites other than the midline. There is no facial ring or hernial sac, and surgical correction is avoided, unless it is significantly symptomatic.

According to the national operative statistics, 15–20% of all abdominal wall hernias were incisional hernias. Epigastric and umbilical hernias constitute 10% of all hernias. In women, incisional hernias are twice more common than in men. Clear evidence demonstrating that the suture type at the primary operation affects the formation of hernia is lacking\(^1\). The formation of ventral hernia is linked with many factors including gender,
age, obesity, sleep apnea, emphysema, and prostatism. Other factors associated with collagen destruction in the lung increased hernia formation. The use of a suture to winding length ratio of 4:1 has been shown to reduce the formation of incisional hernia significantly as compared with the 1 cm bites and 1 cm advanced suturing technique typically used by most surgeons [2].

Whether the incisional hernia rate is influenced by the type of initial abdominal incision remains controversial. As noted, the incidence of ventral herniation post-midline laparotomy ranges from 3% to 20% and doubles in case of a surgical site infection. A meta-analysis of many cases shows that the incidence of ventral hernia formation post different types of abdominal incisions are 2.5% for paramedian incisions, 7.5% in transverse incisions, and 10.5% in case of midline incisions. [3].

AIM OF THE STUDY

To compare onlay and sublay techniques of ventral hernia repair in terms of procedures and outcomes.

Patients and methods

This prospective comparative study was carried out on 120 patients of abdominal hernias admitted in the general surgical unit of Al-Imam Al-Hussein Medical City. Cases were registered in one year starting from 1st January 2015 till the 1st of January 2016) and followed up continued till January 2017. The majority of the cases were registered at the beginning of the year 2015, wherein the average follow-up was 1–2 years with quarterly visits, followed by clinical examination and confirmation by way of ultrasound.

In this study, 60 cases of ventral hernias were managed by onlay (group A) mesh repair and 60 others by sublay (group B) mesh repair. A similar type of mesh (polypropylene) in both the groups was used, and whether onlay or sublay technique was to be followed was left to the surgeon’s preference and experience. Follow up of patients of both the groups was performed by checking the following parameters: operative time; drain placement time, which is one drain placed subcutaneously; wound complications; and recurrence rate.

Inclusion criteria

All patients of both genders with the following criteria were included in the study:

1. Post-laparotomy midline incisional hernias and recurrent hernias.
2. Primary hernias (umbilical, paraumbilical, or epigastric), diagnosed on clinical examination and confirmed by ultrasound.

Exclusion criteria

The following groups of patients who had different comorbidities with different degrees of influence on the outcome of the surgery, based on the degree of severity of these comorbidities were excluded from this study to make the procedure the most probable cause of complications:

1. Morbidly obese patients with BMI>40 kg/m².
2. Patients with diabetes mellitus.
3. Patients with abdominal malignancy and cirrhosis with end-stage liver disease.
4. All patients with chronic obstructive pulmonary disease (COPD) such as asthma.
5. Patients with obstructive uropathy such as benign prostatic hypertrophy (BPH).
6. Patients presented as emergency cases such as strangulated hernia with signs of obstruction (abdominal distention, vomiting, and absolute constipation) and those who lacked follow-up.
7. Preexisting skin infection at the site of hernia with local signs of inflammation (redness, hotness, and tenderness).

Operative Technique

A/Sublay mesh repair

The principles of the retrorectus or sublay mesh repair included two main steps: mesh placement deep into the recti muscles and mesh extension well beyond the hernial defect. The medial edge of each rectus muscle was identified by palpation, and the extreme medial edge of each rectus sheath was incised along its length to reach the submuscular space. This relatively bloodless plane could be created to the lateral edges of the rectus muscle on each side. Primary "peritoneal" closure was obtained using posterior rectus sheath above the arcuate line, the peritoneum itself, or excess sac below the arcuate line. The posterior rectus sheath along with the peritoneum...
is closed with zero proline sutures. Then, the mesh is fastened around and well beyond the defect (about at least 5 cm). The center point of the mesh was assigned by a stitch to avoid malpositioning of the mesh and edges of the mesh were fixed to the posterior rectus sheath by way of multiple stitches. Organs within the abdomen are isolated from injury using the mesh along with a layer of posterior rectus sheath and peritoneum. Adhesions are thereby prevented due to the high viscosity of the mesh. The edges of the muscular sheath were sutured over the mesh by nonabsorbable nylon sutures.

B/Onlay Mesh Repair

Onlay repair was performed with skin incision over the bulge or the defect. Both the rectus sheath and the defect containing the hernia contents were identified using sharp and blunt dissection. The hernial sac was clearly dissected and the contents were dealt with while the margins of the defect were held by Kocher forceps. The sac’s was treated by reducing its contents into the abdominal cavity. With nonabsorbable sutures, the defect in the linea alba was closed and a proline mesh of adequate size was placed on the rectus sheath and fixed with stiches. Redivac suction drains were used for all cases of the two groups with mean time periods of 5 and 7 days for sublay and onlay techniques, respectively, and removed when drainage was observed to less than 20 ml in 24 hours. All surgeries were performed under general anesthesia, and all patients were administered 1 gm 3rd-generation cephalosporin antibiotic preoperatively at the time of induction and continued till the 2nd postoperative day (1 gm) daily. Data were analyzed using SPSS 18.0 software; Fisher’s exact test was considered as appropriate for analyzing statistical significance; \( p < 0.05 \) was considered to be statistically significant.

RESULTS

A total of 120 patients of ventral hernias were managed by both sublay mesh and onlay mesh repair techniques. The youngest patient was 22 year old and the oldest 77 year old; the mean age of the patients was 48 ±5 years. The majority of the patients were female, that is, 90 patients, which represented 75%, and 30 male patients represented 25% of the sample. The majority of the patients were between 51 and 60 years totaling to 40 patients who represented 33.33% of all patients studied. The second age group was 41–50 years, which constituted 25% of the patients (i.e., about 58% or more than half of patients from age 40–60 years as shown in Table 1.

### Table 1. Age and gender distribution.

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Male (30)</th>
<th>Female (90)</th>
<th>Total</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>4</td>
<td>5</td>
<td>9</td>
<td>7.5</td>
</tr>
<tr>
<td>31-40</td>
<td>8</td>
<td>12</td>
<td>20</td>
<td>16.66</td>
</tr>
<tr>
<td>41-50</td>
<td>6</td>
<td>24</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>51-60</td>
<td>8</td>
<td>32</td>
<td>40</td>
<td>33.33</td>
</tr>
<tr>
<td>61-70</td>
<td>3</td>
<td>12</td>
<td>15</td>
<td>12.5</td>
</tr>
<tr>
<td>71-80</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>90</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

In this study, most hernias repaired were of spontaneous type (60%), whereas those of incisional type were less and represented 40% of the sample.

Seroma formation was observed in 2 patients (3.33%) in the sublay group, whereas in 12 patients (20%) of the onlay group. Wound infection was seen in one patient (1.66%) of the sublay technique group, whereas in 6 (10%) patients of the onlay group. One patient (1.66%) of the second group suffered from mesh infection and needed its removal, whereas none was observed in the sublay group. Wound edge necrosis occurred in one of the patients (1.66%) of the onlay repair, which was managed by excision of the necrotic edge and primary suturing, and no such case of flap edge necrosis occurred in the sublay group. Paralytic ileus as a complication was observed equally in both studied groups, with one such case (1.66%) in each group. Regarding recurrence rate in the duration of 2 years, follow-up in the sublay group exhibited in no recurrence (0%), whereas that in the onlay group it was observed in 4 patients (6.66%).

The tests of significance were assessed by \( p \) value, and it was discovered that it was statistically significant in three postoperative complications that are still the main problems in the surgical management of hernias which are as follows:

1.  Seroma Formation
2.  Wound Infections
3.  Recurrence rate
Otherwise, there were no significant differences (statistically) in other variables in the study, as shown in Table 2.

### Table 2. Postoperative complications

<table>
<thead>
<tr>
<th>Postoperative complications</th>
<th>Sublay group n = 60 (%)</th>
<th>Onlay group n = 60 (%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seroma</td>
<td>2 (3.33)</td>
<td>12 (20)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Wound infection</td>
<td>1 (1.66)</td>
<td>6 (10)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Mesh removal</td>
<td>0 (0)</td>
<td>1 (1.66)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Recurrence</td>
<td>0 (0)</td>
<td>4 (6.66)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Flap necrosis</td>
<td>0 (0)</td>
<td>1 (1.66)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Paralytic ileus</td>
<td>1(1.66)</td>
<td>1(1.66)</td>
<td>1.000</td>
</tr>
</tbody>
</table>

### DISCUSSION

Ventral abdominal wall hernias are a common surgical problem encountered in clinical practice. The outcome of the surgery is based not only on the technique used but also on the experience of the operator, meticulous dissection, tension-free repair, and so on [6]. Many methods are available to deal with these hernias. Commonly practiced techniques for hernial repair use mesh, which is placed either in a sublay or onlay position [7]. The refinement of the sublay technique decreased the recurrence rates and resulted in an overall better outcome that renders it suitable to be declared the gold standard care of ventral hernias. Primary tissue repair is associated with higher unacceptable recurrence rate. Nowadays tension-free mesh repair is an ideal hernia repair technique [8].

However, the optimal technique for mesh placement has not been established and remains controversial. The prosthetic mesh can be placed either between the subcutaneous tissues of the abdominal wall and the anterior rectus sheath (onlay mesh repair) or in the preperitoneal or retromuscular (sublay mesh repair). The latter technique has several advantages, one of them being not transmitting the infection from subcutaneous tissues down to the mesh as it lies quite deep inside the subcutaneous tissues [9]. Increased intraabdominal pressure that acts anteriorly on the margins of the mesh tends to push it toward the abdominal wall rather than distracting it away from it. Some studies suggest that the use of the sublay technique as a treatment option for ventral hernias appears to be less complicated than the onlay technique [10, 11, 12].

### CONCLUSIONS

The sublay mesh hernioplasty is a better alternative to onlay mesh hernioplasty for all forms of ventral hernia cases.

Minimal complications and better outcome with sublay mesh hernioplasty in comparison with the onlay technique.

### RECOMMENDATIONS

Because of less complications of infections, seroma formation and low recurrence rate in sublay mesh repair during 2 years follow up in which most of the recurrence happens, the use of this method for the repair of ventral hernias is encouraged.

We recommend increasing the number of the patients in the study groups and prolongation of follow-up time to obtain more reliable results.

**Ethical Clearance** - taken from the scientific committee in Department of Maxillofacial Surgery, College of Dentistry, Kerbala University, Iraq. In their reference no.89 at 2nd. October 2017.

**Source of Funding** - Self-funding research.

**Conflict of Interest** – None

### REFERENCES


Estimated Analysis on Environmental Health Risk of 2.5 Micron Particulate Matter to Urban Communities in South Jakarta

Alvia Hamastia¹, Ema Hermawati², Rina Marina¹, Rideho Andrian¹
¹Bachelor and Magister Program of Public Health, ²Lecture of Master Program in Public Health Faculty, Universitas Indonesia, Depok, Indonesia

ABSTRACT

Background: Urban areas with their numerous activities including transportation, industrial and building construction activities are places that may potentially become the sources of pollution for human health, especially in areas with high population density. PM$_{2.5}$ potentially causes health problems to humans because inhaled pollution remains in alveoli. This may trigger respiratory diseases to cardiovascular diseases.

Objective: The study was to determine the risk level of PM$_{2.5}$ exposure in Jakarta on people living in areas around the ready-mix industry.

Material & Method: The analysis carried out in this study is an environmental Health Risk Analysis (HRA) conducted to associated with pattern of activities, anthropometric data, and PM 2.5 concentration. This study involved 92 respondents with 10 study area points.

Result: The result of study reveals that there is 1 point having the risk of experiencing health problems with the Hazard Quotient HQ> 1. Although, overall, the people who reside in the study area are on average still relatively safe up to the present, when the health risk in the environment has exceeded the safe limit as at point 1 there must be a risk estimation at 9 other points to identify the safe limit in future.

Keywords: Air Pollutant, Particulate Matter, Health Risk Analysis, Urban Area.

INTRODUCTION

Particulate matter of less than 2.5 micron in size is in the form of gas and condensation from the activity of construction and demolition works, and mining operations. PM$_{2.5}$ particle matter is formed from gas and condensation of high temperature vapors during combustion and industrial activities. PM$_{2.5}$ can remain in the air for a long time and may fly to areas hundreds of miles in distance and can easily penetrate through buildings. Consequently, air pollution can affect human health.

Quoted from Greenpeace based on the air quality monitoring conducted by the American Embassy in South Jakarta and Central Jakarta, the air quality of PM$_{2.5}$ parameter is very hazardous for the health. The results of monitoring on PM$_{2.5}$ air quality by Greenpeace also showed results which are not different from the US Embassy’s monitoring with the air pollution index value of AQI 153 in Central Jakarta, and 169 in South Jakarta. The air quality monitoring carried out since January 2017 in 21 locations in the Jakarta Metropolitan Area indicates that the last six months shows an unhealthy air level for humans and will cause more serious health impacts to sensitive groups, such as children, pregnant women, and elderly people.

The PM$_{2.5}$ mass concentration in Ahmedabad, India ranged from 0.032 to 0.106 mg/m$^3$, and Yokohama, Japan 0.363 – 0.04778 mg/m$^3$, while the PM 2.5 concentration in Beijing ranged between 0.07 and 0.1 mg/m$^3$. The DOI Number: 10.5958/0976-5506.2019.00311.5
particulate air pollution mostly comprises PM$_{2.5}$ which size is smaller than 1/30rd part of human hair with a diameter of 70 μm consisting of sulfate, nitrate, organic compounds, ammonium compounds, metals, acidic material. Five specific sources of PM$_{2.5}$ namely sulfate, residual oil, traffic, metal industry and ground steel.

**METHOD**

**Sampling Site**

Jakarta, based on Indonesian Statistics in 2017, is one of the largest cities in Indonesia with the population density of 15,663 people / km$^2$ where a number of medium and large-scale industries operate reaching 1,410. South Jakarta hosted 68 medium and large-scale industries in 2012. Analysis on the health risk of PM$_{2.5}$ was performed in two districts in South Jakarta, namely in Jagakarsa District with a population density of 15,148 people/km$^2$ and Pasar Minggu District which has a population density of 14,029 people/km$^2$.

**Sampling Method**

High Volume Air Sampler (HVAS) is a device that is used to collect particles through filtration that can collect particles up to 0.1 μm in size with an efficiency of 99.95% for a particle size 0.3 μm. The total number of particles accumulated in the filter for 1 hour is analyzed gravimetrically during which the flow rate is monitored. The results were displayed in the form of particulate mass units collected per volume unit of air samples taken as μg/m$^3$. This method is adjusted to the Indonesian National Standard (SNI) method 19-7119.3-2005 with normative references following the United States Environmental Protection Agency (USEPA) method IO-2.1 1999. Sampling of ambient air for Total Suspended Particulate Matter (SPM) and PM$_{10}$ use the method reference from the Third Edition 501 of high volume measurement of size classified as Particulate Matter and Government Regulation of the Republic of Indonesia Number 41 of 1999 concerning air pollution control. Measurement of PM$_{2.5}$ concentration, temperature, humidity, and wind direction were carried out at 10 points.

**Health Risk Analysis Methods**

Health Risk Assessment (HRA) can be observed by knowing the characteristics of effects that potentially harm human health by pollutant exposure. HRA is the process to estimate the nature and possible adverse health effects to humans who may be exposed to hazardous substances. Its four basic steps are hazard identification, exposure analysis, dose-response assessment, and risk characterization. Hazard identification aims to recognize various hazards that adversely affect the health, while exposure analysis has the purpose to identify exposure pathways of risk agent so that the total intakes received by individuals in the risky population can be determined. Dose-response assessment is to estimate the amount of substances needed to cause varying degrees of adverse health effects. Health risk level is expressed as Risk Quotient (RQ) or Hazard Quotient (HQ). HQ is calculated by comparing the intake value and the Reference Concentration (RfC).

The risk level for non-carcinogenic contaminants is determined by calculating the HQ. If the HQ equals to or exceeds one, there is a risk that may endanger the health.

$$\text{HQ} = \frac{\text{Intake}}{\text{RfC}}$$

Where intake indicates the average daily intake of non-carcinogenic substances during the exposure period. RfC indicates reference concentration. The intake of risk agent must be calculated for all exposure pathways in accordance with the anthropometric characteristics and the activity pattern of the population at risk with the following equation,

$$\text{Intake} = \text{CA} \times \text{IR} \times \text{ET} \times \text{EF} \times \text{ED} \times \text{BW} \times \text{AT}$$

Where CA indicates the concentration of PM$_{2.5}$ (mg/m$^3$) in the air, IR indicates the inhalation rate (m$^3$/hour), ET indicates the exposure time (hours/day), EF indicates the exposure frequency (days/year), ED indicates the exposure duration, BW indicates the body weight (Kg), and AT indicates the average time (days), 30 (years) x 365 (days/year).
RESULTS AND DISCUSSION

PM$_{2.5}$ Concentration

Table 1. Climatological Factor of Exposure

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Point 1</th>
<th>Point 2</th>
<th>Point 3</th>
<th>Point 4</th>
<th>Point 5</th>
<th>Point 6</th>
<th>Point 7</th>
<th>Point 8</th>
<th>Point 9</th>
<th>Point 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>C (mg/m$^3$)</td>
<td>0.091</td>
<td>0.037</td>
<td>0.032</td>
<td>0.037</td>
<td>0.040</td>
<td>0.046</td>
<td>0.037</td>
<td>0.064</td>
<td>0.048</td>
<td>0.043</td>
</tr>
<tr>
<td>T (°C)</td>
<td>28.6</td>
<td>30.8</td>
<td>30.8</td>
<td>31.1</td>
<td>28.8</td>
<td>29.5</td>
<td>30.3</td>
<td>32.6</td>
<td>31.8</td>
<td>32.0</td>
</tr>
<tr>
<td>RH (%)</td>
<td>74</td>
<td>68</td>
<td>68</td>
<td>64</td>
<td>64</td>
<td>59</td>
<td>56</td>
<td>50</td>
<td>53</td>
<td>52</td>
</tr>
<tr>
<td>Wind</td>
<td>North</td>
<td>North</td>
<td>North</td>
<td>North</td>
<td>West</td>
<td>North</td>
<td>West</td>
<td>East</td>
<td>South</td>
<td>East</td>
</tr>
</tbody>
</table>

The highest PM$_{2.5}$ concentration is at point 1 (Table 1), namely 0.091 mg/m$^3$. This graphic (Graphic 1) exceeds the threshold value set by the National Air Ambient Quality Standard (NAAQS) namely 0.035 mg/m$^3$. Air humidity at point 1 is also at the highest value among other points which is 74%, which is contrary to the temperature. The temperature at point 1 is at the lowest 28.6%. Low temperature air will pose more risk to the health because the cold air will be trapped and is difficult to exit the area.  

![Graphic 1. PM$_{2.5}$ Concentration](image)

Risky Assignment

The reference concentration (RfC) is the reference dose obtained from the US EPA. As RfC has not been determined for PM$_{2.5}$, the RfC value in this study refers the safe limit that was proposed by the US-EPA National Ambient Air Quality Standard (NAAQS) in 2006 for PM$_{2.5}$ namely 0.035 mg/m$^3$. To equalize the intake with the RfC, the concentration of risk agent is reduced using the EPA default value, namely IR = 0.83 m$^3$/hour, ET = 24 hours/day, EF = 350 days/year, BW = 70 kg, AT = 365 days/year, ED = 30 years, then obtained:

\[\text{RfC} = 0.035 \text{ mg/m}^3 \times 0.83 \text{ m}^3/\text{h} \times 24 \text{ hours/day} \times 350 \text{ hours/year} \times 30 \text{ years} = 70 \text{ kg} \times 30 \times 365 \text{ hours/year} \times 0.009 \text{ mg/kg/day} = 0.009 \text{ mg/kg/day}\]

Hence, the safe limit based on the reference concentration is 0.009 mg per kilogram of body weight per day. This value is used to determine the risk of PM$_{2.5}$ exposure in calculating the risk level (Table 2).

Table 2. Risk level of PM$_{2.5}$ concentration at the study points

<table>
<thead>
<tr>
<th>Site point</th>
<th>PM$_{2.5}$ Concentration (mg/m$^3$)</th>
<th>LADD (mg/kg/day)</th>
<th>HQ Value</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.091</td>
<td>0.01576</td>
<td>1.7511</td>
<td>HQ ≥ 1</td>
</tr>
<tr>
<td>2</td>
<td>0.037</td>
<td>0.00535</td>
<td>0.5948</td>
<td>HQ &lt; 1</td>
</tr>
<tr>
<td>3</td>
<td>0.032</td>
<td>0.00653</td>
<td>0.7254</td>
<td>HQ &lt; 1</td>
</tr>
<tr>
<td>4</td>
<td>0.037</td>
<td>0.00798</td>
<td>0.8861</td>
<td>HQ &lt; 1</td>
</tr>
<tr>
<td>5</td>
<td>0.04</td>
<td>0.00567</td>
<td>0.6296</td>
<td>HQ &lt; 1</td>
</tr>
<tr>
<td>6</td>
<td>0.046</td>
<td>0.00403</td>
<td>0.4473</td>
<td>HQ &lt; 1</td>
</tr>
<tr>
<td>7</td>
<td>0.037</td>
<td>0.00610</td>
<td>0.6775</td>
<td>HQ &lt; 1</td>
</tr>
<tr>
<td>8</td>
<td>0.064</td>
<td>0.00199</td>
<td>0.2212</td>
<td>HQ &lt; 1</td>
</tr>
<tr>
<td>9</td>
<td>0.048</td>
<td>0.00697</td>
<td>0.7749</td>
<td>HQ &lt; 1</td>
</tr>
<tr>
<td>10</td>
<td>0.043</td>
<td>0.00703</td>
<td>0.7807</td>
<td>HQ &lt; 1</td>
</tr>
<tr>
<td>Average</td>
<td>0.041</td>
<td>0.00512</td>
<td>0.5690</td>
<td>HQ &lt; 1</td>
</tr>
</tbody>
</table>
Estimating Risk

Each point has different time spans to experience risks. The range of risky time for each point is determined based on the community condition and environment condition.

Table 3. Average of anthropometry and PM$_{2.5}$ concentration

<table>
<thead>
<tr>
<th>Point</th>
<th>Concentration (mg/Nm$^3$)</th>
<th>Weight (Kg)</th>
<th>Exposure Time (hours/day)</th>
<th>Exposure Frequency (days/year)</th>
<th>Duration (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point 1</td>
<td>0.091</td>
<td>52.1</td>
<td>23</td>
<td>358</td>
<td>20.5</td>
</tr>
<tr>
<td>Point 2</td>
<td>0.037</td>
<td>64.7</td>
<td>23</td>
<td>350.67</td>
<td>23.22</td>
</tr>
<tr>
<td>Point 3</td>
<td>0.032</td>
<td>55.4</td>
<td>23</td>
<td>358</td>
<td>21.7</td>
</tr>
<tr>
<td>Point 4</td>
<td>0.037</td>
<td>63</td>
<td>24</td>
<td>363.97</td>
<td>27.13</td>
</tr>
<tr>
<td>Point 5</td>
<td>0.04</td>
<td>64.2</td>
<td>24</td>
<td>359</td>
<td>18.3</td>
</tr>
<tr>
<td>Point 6</td>
<td>0.046</td>
<td>55.7</td>
<td>23</td>
<td>358</td>
<td>10.8</td>
</tr>
<tr>
<td>Point 7</td>
<td>0.037</td>
<td>58.7</td>
<td>24</td>
<td>362.5</td>
<td>19.9</td>
</tr>
<tr>
<td>Point 8</td>
<td>0.064</td>
<td>65.4</td>
<td>24</td>
<td>365</td>
<td>4</td>
</tr>
<tr>
<td>Point 9</td>
<td>0.048</td>
<td>60</td>
<td>24</td>
<td>365</td>
<td>17.67</td>
</tr>
<tr>
<td>Point 10</td>
<td>0.043</td>
<td>55.4</td>
<td>24</td>
<td>365</td>
<td>18.89</td>
</tr>
<tr>
<td>Average</td>
<td>0.041</td>
<td>58.5</td>
<td>24</td>
<td>362</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 4. Estimating Health Risk Analysis Several Years Later

<table>
<thead>
<tr>
<th>Point</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Now</td>
</tr>
<tr>
<td>1</td>
<td>1.751</td>
</tr>
<tr>
<td>2</td>
<td>0.595</td>
</tr>
<tr>
<td>3</td>
<td>0.725</td>
</tr>
<tr>
<td>4</td>
<td>0.886</td>
</tr>
<tr>
<td>5</td>
<td>0.630</td>
</tr>
<tr>
<td>6</td>
<td>0.447</td>
</tr>
<tr>
<td>7</td>
<td>0.678</td>
</tr>
<tr>
<td>8</td>
<td>0.221</td>
</tr>
<tr>
<td>9</td>
<td>0.775</td>
</tr>
<tr>
<td>10</td>
<td>0.781</td>
</tr>
<tr>
<td>Average</td>
<td>0.569</td>
</tr>
</tbody>
</table>

In year 2018 (at present) only point 1 has risk. Point 1 is located 200 meters from a readymix industry, to the northwest direction the same direction as the dominant wind direction in May 2018. This causes the PM2.5
concentration to be at the highest point 1 compared to other points. Risk estimation which also involves anthropometric data and patterns of community activity (Table 3) indicates that currently the people who reside at point 1 may be at the risk of experiencing health problems. 4 years later in 2022, the HQ value at point 4 will already have risks exceeding 1 (HQ≤. 2 years afterward points 9 and 10 will be in risky areas, and 4 years later point 7 will be in a risky area, then each point will have risk with an interval of 1 year. Up to 15 years thereafter, in 2033, 10 points in the study area will be at risk of experiencing health problems if the concentration value, anthropometric data and activity patterns do not change (Table 4).

**Safe Limit**

Inhaled PM$_{2.5}$ can deposit deep in alveoli and may cause inflammation and oxidative stress and alter the cardiac work system. Earlier studies on primarily respiratory health effects, mentioned that PM$_{2.5}$ is one of factors that cause cardiovascular diseases (CVD) including hypertension, increased visits to hospitals, and cardiovascular mortality 12. High plaque deposit in arteries causes sudden cardiac arrest and other cardiovascular diseases 13.

Estimating safe concentration as the highest limit of PM 2.5 concentration value in an area is calculated using the formula to find safe concentration,

$$CA= \frac{RfC \times BW \times AT \times IR \times ET \times EF \times ED}{AT}$$

Of the 10 research points (Table 4), point 1 is the location currently at risk based on the value of HQ. Determination of safe concentration at point 1 with PM2.5 concentration is 0.091 mg/m$^3$ with the exposure duration of 20.5 years. In calculating safe concentration, the highest concentration that can be tolerated with the activity pattern and anthropometric data at point 1 is 0.052 mg/m$^3$. If the concentration under the same condition exceeds 0.052 mg/m$^3$ there will be a health impact on the community particularly in the respiratory system.

The researchers observed that PM$_{2.5}$ exposure is related to dementia 12. Weuve et al showed that older US women (70 years or older) living in areas with higher levels of PM$_{2.5}$ have more rapid cognitive decline over a 2 year period 14. They concluded that long-term exposure (7-14 years) for particulate matters at the level typically experienced by many individuals in the United States is associated with significantly worse cognitive decline in older women.

Increased PM$_{2.5}$ concentration also increases risk of inpatient treatment for myocardial infarction, dysrhythmias, heart failure and cardiac arrest 15. With regard to non-fatal effects, the risk of myocardial infarction has been estimated to be 1.48 times greater in increased PM2.5 concentration (0.025 mg/m$^3$ in two hours) 16. Increased PM$_{2.5}$ in humans corresponds with the incidence of atherosclerosis and carotid intima-media thickening 17. Some studies suggest that each decrease by 0.01 mg/m$^3$ of long-term exposure to PM2.5 can increase by up to 22 months of life expectancy for persons 30 years of age or older. Based on a research in 2004, an increase of PM$_{2.5}$ by 0.01 mg/m$^3$ is associated with an increased risk of mortality by 8% to 18% 13.

**CONCLUSION**

Health risks can be seen from the risk level of PM$_{2.5}$ exposure in areas around a readymix industry. The level of health risk is determined not only by exposure to pollutant concentration, but involves anthropometric data and patterns of the community’s activities that affect the high rate of public health risk in certain areas. Health risks can be viewed from the risk level of PM$_{2.5}$ exposure in the environment around a readymix industry.

**Ethical Clearance** – Taken from Universitas Indonesia Ethics Commision

**Source of Funding** – Research funding from International Indexed Student Grant for Student Final Assignment (PITTA Grant) of 2018 Fiscal Year, Number 2190/UN2.R3.1/HKP.05.00/2018

**Competing Interest**

The authors report no competing interest

**REFERENCES**


7. Rosalia O, Wispriyono Bambang, Kusnoputranto H, Karakteristik Risiko Kesehatan Non Karsinogen pada Remaja akibat pajanan inhalasi debu particulate matter <1,5(PM 2.5). (Characteristics of Non-Carcinogen Health Risk to Teenagers due to Exposure and Inhaled Particulate Matter <1.5(PM 2.5)) Jurnal MKMI. 2018;14 (1) : 26 - 35


Effects of Multimicronutrient and IFA Supplementation in Preconception Period Against Birth Length and Birth Weight: A Randomized, Double Blind Controlled Trial in Banggai Regency, Central Sulawesi

Lucy Widasari¹, Maisuri T Chalid², Nurhaedar Jafar¹ Abdul Razak Thaha³

¹Doctoral Student, Faculty of Public Health, Hasanuddin University, ²Obstetric and Gynecology Department Medical School Hasanuddin University, Makassar, Indonesia, ³Faculty of Public Health, Nutritional Sciences, Hasanuddin University, Makassar, Indonesia

ABSTRACT

Background: The beneficial effects of MMN and Iron Folic Acid (IFA) supplementation on pregnancy outcomes is still debatable. The objective of this study is to know the effect of IFA and MMN supplementation since preconception period on pregnancy outcomes. Multimicronutrient deficiencies may contribute to low birth weight and birth length which is associated with increased risk of infant morbidity and mortality in developing countries.

Method: The research was conducted in three sub-districts of Banggai district, namely, Luwuk, North Luwuk, and South Luwuk. This was a double blind study, randomized controlled trial, providing multimicronutrient for women from preconception period using prospective design with saturated sampling technique. A total of 19 preconception women followed until pregnancy and look at the pregnancy outcomes were enrolled from September 2016 to January 2018.

Results: The mean birth weight of infants born to pregnant women in the MMN group was heavier at 3142.5 g with a value (p=0.001). LBW percentage of pregnant women MMN group was smaller, equal to 8.3% with value (p=0.863). The average length of infant born to pregnant women in MMN group was longer, 49.5 cm with value (p=0.001). Short birth length (<48 cm) of pregnant mother MMN group smaller, equal to 41.7% with value (p=0.515).

Conclusions: Pregnant women who get MMN intervention produce better pregnancy outcomes. The nutritional status of women before pregnancy is very important to achieve mother and fetal welfare and also considered as the most important thing for governing fetal growth.

Keywords: Preconception period, multimicronutrient, birth weight, birth length

INTRODUCTION

Low birth weight (LBW) is associated with the increasing risk of infant morbidity and mortality in developing countries¹. It has been estimated that infants weighing 2000–2500 and 2500–3000 g at birth are four- and two-times higher risk of post neonatal mortality than those weighing 3000–3500 g, respectively. Through its impact on fetal growth and micronutrient stores, nutrition of the pregnant woman contributes to infant morbidity and mortality²,³,⁴.

Epidemiological studies suggest that the interaction between maternal nutritional intake, hormonal disorders, and placental development is a determinant of stunting. Stunting events begin in the womb and continue until at least 24 months of age; so that the preconception period

Presenting author:
Lucy Widasari,
E-mail:drlucywidasari@gmail.com
0812-19533645
up to 2 years is a critical period for the occurrence of stunting and a priority for intervention. Babies born less than 2500 grams are classified as premature and small during pregnancy (small for gestational age) a high risk for stunting.

Maternal Mortality Rate in Banggai district in 2014 is relatively high, (279/100,000) compare to the national target 2015 (102/100,000). To overcome these problems, innovative efforts as a breakthrough to accelerate improvement of the nutritional and health status of Preconception Women (PcW) has been started in Integrated Health Post (Posyandu) for PcW. The services to pregnant women or antenatal care have been hampered by the delay of first contact (K1) of pregnant women, and the big number of cases of anemia in pre-pregnant women (preconception). Therefore, preconception women services supposed to be a very important action, which is part of Maternal and Child Health Service (MCH) in Banggai District. Preconception health services are health services for women of reproductive age, before the first pregnancy which is a public health strategy to improve women’s health and reduce maternal and child mortality. By following the preconception health service, the mother to-be are able to get early identification of pregnancy risk factors such as anemia before pregnancy, identifying and managing maternal conditions and behaviors during pregnancy which may pose a risk to both mother and newborn.

UNICEF/WHO/UNU proposed a multimicronutrient (MMN) prenatal supplement to replace the existing iron folic acid (IFA) supplement, which has been recommended for decades as a means of preventing maternal anaemia. Multimicronutrient supplementation since preconception period is considered a feasible public health strategy in areas with micronutrient deficiencies and can potentially benefit both mothers and their infants. Still, the evidence for benefits of MMN supplementation on pregnancy outcome is sparse. We conducted a randomised, double blind controlled trial in which the effects on birth weight and birth length multimicronutrient supplementation with RDA of 15 multimicronutrients were compared with the conventional iron folic acid (IFA) supplement containing ferro sulfate / ferro fumarate or ferro gluconate and 0.25 mg folic acid.

**Multimicronutrient (MMN) supplementation**

Maternal micronutrient deficiency during pregnancy is an outstanding public health issue worldwide. Due to the increased nutritional requirement, pregnant women are vulnerable to micronutrients deficiency. However, the beneficial effect of MMN supplementation on preconception women and during pregnancy and on postnatal growth of children are still unclear. There has been a scarce studied on the prevention of MMN deficiencies as a strategy to reduce the risk of prenatal anaemia and attention has tended to focus instead on iron supplementation during pregnancy, with conflicting results.

MMN supplementation should be considered as a strategy for improving the micronutrient and haematological status of preconception women of reproductive age. MMN supplementation using the United Nations International Multiple Micronutrient Preparation (UNIMMAP) is a balanced preparation of 15 vitamins and minerals formulated by an Expert Committee of the United Nations Children’s Fund, primarily for using by pregnant and lactating women. The MMN tablet consist of vitamin A (retinyl acetat) 800 RE, vitamin E 10 mg, selenium 65 microgram, vitamin D3 (Colecalciferol) 200 IU, vitamin B1 (Thiamin) 1.4 mg, vitamin B2 (Riboflavin) 1.4 mg, vitamin B3 (Niacin) 18 mg, vitamin B6 1.9 mg, vitamin B12 (cyanocobalamin) 2.6 microgram, asam folat 400 microgram, vitamin C 70 mg, iron 30 mg (iron sulphate), zinc 15 mg (zinc sulphate), iodium 150 microgram and cuprum (cooper sulphat) 2 mg.

**MATERIAL AND METHOD**

**A randomized, double blind controlled Trial**

To fulfill a double-blind requirement, MMN from UNICEF in the form of tablets was processed into capsules. The MMN tablet and IFA tablet is crushed and then put into a combination of pink and white capsules. MMN capsules and control capsules are both made with similar weight and color. Subjects, data collectors and researchers did not know whether the capsules contained MMN or iron folate, so the parties involved in the field did not know whether the subjects were in the MMN group or iron folate group.

**Randomisation and intervention**

The women enrolled in the study were individually randomized with iron folic acid and multimicronutrient supplements. MMN supplementation using the United
Nations International Multiple Micronutrient Preparation (UNIMMAP) is a balanced preparation of 15 vitamins and minerals formulated by an Expert Committee of the United Nations Children’s Fund, primarily for using by pregnant and lactating women. One group received a daily multimicronutrient tablet containing of 15 micronutrients as recommended in the future prenatal supplement. The control group received the conventional prenatal iron folic acid (IFA) supplement. Preconception women were instructed to take one tablet weekly if not in menstruating period, and to take one tablet daily if in menstruating period and during pregnancy preferably together with breakfast.

The manufacturer provided the tablets in containers with a colour code for each intervention group. This code was kept secret from study participants, study personnel, and data analysts until data cleaning and preliminary data analysis had been carried out. For managing administration in the field, randomization by excel randomization six block program AABB, ABAB, ABBA, BBAA, BABA, and BAAB was done. However, the health workers who collected outcome data after delivery did not have any knowledge of intervention group of the women.

Android gate way

There has been conducted a 24-hour consultation and monitoring of capsules consumption through android. The team of the first 1000 days of life provides 24-hour consultation services through android to ensure the consumption of capsule and question – answer of daily emerging issues during preconception period–positive pregnancy test up to the delivery.

Study area and population

The study was carried out from September 2016 to Januari 2018 in three sub-districts of Banggai district, namely, Luwuk, North Luwuk, and South Luwuk Central Sulawesi.

Infant Measurements

Newborn weight were measured to the nearest 1 mm with a TANITA digital scale. To measure the infant’s body length using a length board. All measurements were made in the health centers. To ensure reliability, all anthropometric variables were measured twice, by regional public hospital or clinic staff who have been trained and under the supervision of researcher. The average of the 2 measures was used for analysis. The weighing scales were calibrated monthly.

Statistical analyses

The type of statistical test used is adjusted to the type of variable being tested, if there is a test of the relationship between categorical data and categorical data then using the chi-square test, the average difference test depends on the normality of the data (Anova or Kruskal Wallis) when testing the relationship of categorical data and numerical data. Meanwhile the confidence interval used was 95% with p-values < 0.05 were considered significant. All statistical analyses were performed with SPSS 23.0 (SPSS® Inc.)

RESULTS

Homogeneity Test

Homogeneity between groups before treatment is very important in an experimental study, to ensure that differences in conditions after treatment between groups is indeed an effect of treatment (Meneinert, 1986). In table 1 it can be seen that in both IFA and MMN supplementation groups all variables were homogeneous with p value> 0.005 by testing the homogeneity of variance with Anova test.

Table 1. Homogeneity Test for Preconception Women in IFA Supplementation Group and MMN Supplementation Group

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Residential area</td>
<td>0.633</td>
</tr>
<tr>
<td>2</td>
<td>Mother’s age</td>
<td>0.989</td>
</tr>
<tr>
<td>3</td>
<td>Education mother</td>
<td>0.321</td>
</tr>
<tr>
<td>4</td>
<td>Father’s education</td>
<td>0.648</td>
</tr>
<tr>
<td>5</td>
<td>Mother’s work</td>
<td>0.499</td>
</tr>
<tr>
<td>6</td>
<td>Father’s work</td>
<td>0.102</td>
</tr>
<tr>
<td>7</td>
<td>Systolic blood pressure at preconception periode</td>
<td>0.079</td>
</tr>
<tr>
<td>8</td>
<td>Diastolic blood pressure at preconception periode</td>
<td>0.189</td>
</tr>
<tr>
<td>9</td>
<td>Maternal weight at preconception periode</td>
<td>0.086</td>
</tr>
<tr>
<td>10</td>
<td>Maternal height at preconception periode</td>
<td>0.848</td>
</tr>
<tr>
<td>11</td>
<td>Body mass index at preconception periode</td>
<td>0.818</td>
</tr>
</tbody>
</table>
From graph 1, it can be seen that the comparison of the average body weight of infants born in the IFA Supplementation group was lower (2948 g ± SD 344.40) compared to the average body weight of infants born in the MMN supplementation group (3142.5 g ± SD 464.48) and the results of statistical tests showed that there were significant differences in the average of body weight infants born to pregnant women in both groups (p=0.001).

From table 2 shows that in the IFA supplementation group the average body length of infants born to pregnant women was 47.86 cm ± 2.41 median value of 48 cm and the average body length of infants born to pregnant women in MMN supplementation group was 49.5 cm ± 2.54 and median value was 49 cm. The difference in body length of the IFA and MMN supplementation groups was 1.64 cm. The mean birth weight of infants born to pregnant women in the MMN group was heavier at 3142.5 g with a value (p = 0.001). The average length of infant born to pregnant women in MMN group was longer, 49.5 cm with value (p = 0.001).
Table 3. Category Body Length of Infant Born to Pregnant Women in the IFA and MMN Supplementation Group

<table>
<thead>
<tr>
<th>Supplementation Group</th>
<th>Short birth length (&lt;48 cm)</th>
<th>Normal birth length (≥48 cm)</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>IFA</td>
<td>4</td>
<td>57.1</td>
<td>3</td>
<td>42.9</td>
</tr>
<tr>
<td>MMN</td>
<td>5</td>
<td>41.7</td>
<td>7</td>
<td>58.3</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>47.4</td>
<td>17</td>
<td>52.6</td>
</tr>
</tbody>
</table>

*Chi Square Test

From table 3 shows that short birth length (<48 cm) of pregnant mother MMN group smaller, equal to 41.7% with value \( p = 0.515 \).

**DISCUSSION**

The effect of MMN supplementation on infants’ birth weight

Birth weight is a simultaneous effect of energy and protein intake factors that play a dominant role, as well as the role of MMN in determining nutritional status since the preconception period. The meta-analysis of MMN administration and pregnancy outcomes conducted explains that the exact mechanism of how MMN supplementation can affect pregnancy outcomes is not yet understood, but MMN can improve immune function thereby reducing the risk of infection in the mother, improving maternal energy metabolism, improve response to stress, and increase the volume of plasma and erythrocytes circulating in the body.

The effect of MMN supplementation on infants’ birth length

Between the metaphysics and epiphyses lies the growth plate, where bone growth occurs, so that the bones can become long. The increase in height occurs because of the increasing number of cells in the modified growth plate by MMN supplementation, wherein the content of vitamin D which is a steroid prohormon plays an important role in calcium absorption by regulating calcium absorption in the small intestine. Vitamin D stimulates the synthesis of calcium binding proteins and phosphorus binding proteins in the small intestinal mucosa.

Bone mineralization is positively associated with bone mineral density (BMD). Vitamin D deficiency causes a decrease in calcium absorption which causes the release of calcium from the bone to maintain circulating calcium concentration. Vitamin D also plays a role in stimulating the differentiation and proliferation of chondrocytes so that the growth of the bone growth plate is better, resulting in more body length addition compared to the IFA supplementation group. The more nutrient content, the better absorption of vitamins so that its utilization is more effective for bone growth.

There are a number of biological pathways that explain the role of vitamin D that can affect maternal health, placental and fetal growth during pregnancy. In vitro research shows that vitamin D plays an important role in the metabolism of glucose and insulin which can affect the availability of energy for the fetus.

Vitamin D modulates the immune system that can help shape the right maternal immune response to the placenta which also regulates the key target genes associated with proper placental implantation. Vitamin D plays a direct role in the production of antimicrobial peptides such as katablecidin, which are produced after activation regulated by vitamin D receptors where the production requires 25 (OH)-D which plays an important role in preventing infection during pregnancy. Vitamin D also affects bone and muscle growth.

Recent studies have suggested a direct role of vitamin D in the regulation of Hoxa-10 in human endometrial stromal cells. Overall, the study shows that endometrial expression of Hoxa-10 plays an important role in controlling uterine reception, implantation, and desidualization and will further influence fetoplacental...
blood flow.

CONCLUSION

Pregnant women who get multimicronutrient (MMN) intervention since preconception period produce better pregnancy outcomes. Posyandu for PcW in Banggai District has became an innovative intervention to increase the health status of PcW starting from preconception period. Preconception period is the best time for women to modify their dietary habits and select healthy nutritional patterns that associated with better birth outcomes.

Ethical Clarance: The study was approved by the Hasanuddin University with the number 1578/H4.8.4.5.31/31/PP.36-Kometik/2016. All women received an anti-helminthes prophylaxis with albendazole (400 mg base) before receiving the supplementation.

Sources of Funding: Self-funded

Conflict of Interest: Nil

REFERENCES


The Effect of PM$_{2.5}$ Exposure on Workers’ Enzymatic Superoxide Dismutase (SOD) Concentration at a Ready-Mix Concrete Factory in 2018

Aulia Fitriani$^{1}$, Umar Fahmi Achmadi$^{1}$, Budi Hartono$^{1}$, Bambang Wispriyono$^{1}$, Doni Hikmat Ramdhan$^{2}$

$^{1}$Dept. of Environmental Health, Faculty of Public Health, Universitas Indonesia, $^{2}$Dept. of Occupational Health and Safety, Faculty of Public Health, Universitas Indonesia

ABSTRACT

The lungs are exposed to PM$_{2.5}$ via inhalation; PM$_{2.5}$ then settles in the alveoli and circulates via the blood system, causing chronic obstructive pulmonary disease and cardiovascular issues. PM$_{2.5}$ triggers the formation of superoxide anions and provide signals for the formation of superoxide dismutase. Workers at ready-mix concrete factories had long-term exposure to high doses of PM$_{2.5}$. This study investigates the effects of PM$_{2.5}$ on the blood SOD concentration of workers.

This cross-sectional study involved 53 subjects chosen with random sampling and interviewed to obtain individual characteristic data. PM$_{2.5}$ value was measured by gravimetric analysis using High Volume Air Sampler and EPAM-5000. The SOD value was tested with the RanSOD-Kit and read using RX-Monza. Data were analyzed with chi-square and multiple logistic regression.

It was determined that the workers exposed to PM$_{2.5}$ $\geq$65 mg/m$^3$ had a 10x higher risk of obtaining a SOD concentration of $<84.40$ U/mL than the workers exposed to PM$_{2.5}$ $<$65 mg/m$^3$.

There is a significant relationship between PM$_{2.5}$ exposure and SOD concentration. Working status and length of employment were identified as contributing variables (p-value 0.029; OR 10.165; CI 1.276–90.994). This study suggests that PM$_{2.5}$ exposure leads to a decrease in SOD concentration. It is necessary to take preventive measures for workers.

Keywords: superoxide dismutase, antioxidant, oxidative stress, PM$_{2.5}$

INTRODUCTION

The total population of Indonesia in 2010 was 237.641.326, including the urban population of 118.3 million (49.7%) and the rural population of 119.3 million (50.2%)$^{1}$. Such a large population increases the need for building construction and transportation facilities; thus, ready-mix concrete plays an important role in the building material industry. Batchig plants in the ready-mix concrete industry increase the concentration of particulate matter (PM$_{2.5}$) with a diameter of 2.5 mm, impacting the health of workers. The real-time risk calculation shows that 21.4% of batching plant workers are in the at risk category$^{2}$. The safest area that can be inhabited by members of a nearby community is more than 2.5 km from the center of the cement industry and has a PM$_{2.5}$ concentration of about 28 mg/m$^3$$^{3}$. In the presence of fine particles (PM$_{10}$), neutrophils from asthmatic patients showed an increasing tendency to generate reactive oxygen species (ROS)$^{4}$.

Silica and iron comprise the majority of PM$_{10}$ and PM$_{2.5}$ in dwellings between a 500 m and 3000 m radius.
from the cement factory. PM$_{1.4}$ is the external factor that triggers the formation of ROS in the body. PM$_{2.5}$ with an aerodynamic diameter of <10 μm has a greater impact on human health.

The PM$_{2.5}$ surface is rich in transition elements that can increase free radicals. PM$_{2.5}$ triggers chronic obstructive pulmonary disease (COPD); causes inflammation, impaired lung function, and immunity dysfunction; and can change the structure of respiratory epithelium. ROS will damage molecules, such as proteins, carbohydrates, and even DNA, through the lipid peroxidation reaction. ROS plays several physiological roles, such as cell signaling. ROS are normally generated as by-products of oxygen metabolism, environmental stressors (i.e., ultraviolet, ionizing radiation, pollutants, heavy metals), and xenobiotics.

At certain levels, free radicals give signals to the body to establish the superoxide dismutase (SOD) enzyme. The human body provides antioxidants to convert the oxidants into less harmful substances. This SOD enzyme converts superoxide anion radicals into oxygen molecules and hydrogen peroxide which are less reactive. SOD is the first line of defense affected by free radicals. The decrease of total antioxidant capacity is significantly related to the increase of lipid peroxidation.

The purpose of this research is to study the effect of PM$_{2.5}$ exposure on workers’ SOD enzymatic blood concentration at the ready-mix concrete factory in Jakarta.

**MATERIALS AND METHOD**

**a. Study Design**

This research is a cross-sectional design study using simple random sampling from 125 workers. Blood samples were taken from 53 subjects and assayed at the Health Laboratory of Jakarta. The subjects were the workers of a concrete ready mix factory in batching plants; all subjects signed informed consent and were neither ill nor taking special medication.

**b. PM$_{2.5}$ measurement**

Fine particles (<2.5 mm PM$_{2.5}$) were collected from ambient by Tisch high volume air sampler in temperature 28.29±2.15°C and 74.34±8.13%RH. The concentration of indoor PM$_{2.5}$ was measured by 2.5mm-impactor gravimetric HazDust EPAM-5000.

**c. Superoxide dismutase (SOD) measurement**

Blood SOD enzyme concentration was assayed by RanSOD Kit and read by RX-Monza. The role of this measurement is to get the dismutation of the toxic superoxide anion to hydrogen peroxide and oxygen. This method employs xanthine and xanthine oxidase to generate superoxide anion radicals. It will react with 2-(4-iodophenyl)-3-(4-nitrophenol)-5-phenyltetrazolium chloride (I.N.T) to create a red formazan dye. The SOD activity is then measured by the degree of inhibition of this reaction. One unit of the SOD is the one which causes a 50% inhibition of the rate of reduction of INT. The INT reduction rate is linearly associated with the inhibitory activity by SOD. The INT method is easy and inexpensive, which can be used in routine erythrocyte and serum analyses for SOD.

**d. Body Mass Index**

Characteristics of subjects were obtained by interviewing them using questionnaires. The body weight obtained by calibrated scale and the body height obtained by microtoise.

**e. Statistical Analysis**

We analyzed these data by chi-square, while the final model was analyzed by multiple regression.

**f. Ethics**

This study has passed the ethical clearance by the Research Ethics and Community Service Commission, Public Health Faculty, Universitas Indonesia (282/UN2/F10/PPM/00.02/2018 dated 17 April 2018).

**RESULTS**

This research was performed in a batching plant. The subjects were mostly outdoor workers, such as mixer truck drivers, technicians, central mixer unit operators, and waste operators; while only 12 people were administrative employees. The production process is determined as a wet batching plant type where materials are mixed with water in a central mixer and directly poured into the mixer truck. The determination of sample points referred to the National Standard SNI 19-7719.6-2005.
The distribution of PM$_{2.5}$ concentration can be seen in Table 1. The highest amount of PM$_{2.5}$ concentration was found in the stockpile area (129.05 mg/m$^3$) where material loading and unloading activities are carried out using trucks. The lowest amount of PM$_{2.5}$ exposure was found in the office (46.75 mg/m$^3$), the distance of this workspace is relatively far from the center of PM$_{2.5}$ exposure.

Table 1. Distribution of PM$_{2.5}$ Concentration Based on Sampling Points

<table>
<thead>
<tr>
<th>Sampling point</th>
<th>Sampling location</th>
<th>PM$_{2.5}$ (μg/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stockpile</td>
<td>129.05</td>
</tr>
<tr>
<td>2</td>
<td>Central mixer &amp; silo</td>
<td>117.45</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory, workshop &amp; waste treatment</td>
<td>113.35</td>
</tr>
<tr>
<td>4</td>
<td>Outdoor gate &amp; parking lot</td>
<td>120.30</td>
</tr>
<tr>
<td>5</td>
<td>Office</td>
<td>46.75</td>
</tr>
</tbody>
</table>

Table 2. Statistic Overview of PM$_{2.5}$ SOD Concentration and Characteristics of Subjects

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Median</th>
<th>Standard deviation</th>
<th>Min-max</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM$_{2.5}$ (μg/m$^3$)</td>
<td>101.65</td>
<td>113.35</td>
<td>30.47</td>
<td>46.75–129.05</td>
</tr>
<tr>
<td>SOD concentration (U/mL)</td>
<td>99.46</td>
<td>84.40</td>
<td>58.03</td>
<td>30.60–398.40</td>
</tr>
<tr>
<td>Age (year)</td>
<td>34.40</td>
<td>34.00</td>
<td>8.58</td>
<td>20–53</td>
</tr>
<tr>
<td>Length of employment (year)</td>
<td>4.64</td>
<td>3.00</td>
<td>4.53</td>
<td>1–22</td>
</tr>
<tr>
<td>Vegetables &amp; fruits consumption (portion/week)</td>
<td>33.88</td>
<td>28.00</td>
<td>17.08</td>
<td>2–70</td>
</tr>
<tr>
<td>Body mass index (kg/m$^2$)</td>
<td>24.16</td>
<td>23.51</td>
<td>6.01</td>
<td>15.72–33.35</td>
</tr>
</tbody>
</table>

As shown in Table 2, the average PM$_{2.5}$ concentration is 101.65 μm/m$^3$. This value exceeds the maximum limit of 65 μm/m$^3$ as regulated in the Government Regulation No. 41 of 1999. According to this value, we classified subjects into two groups: those who were exposed to PM$_{2.5}$ above 65 μm/m$^3$ and below 65 μm/m$^3$.

Table 3. Subject Characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of subjects exposed to PM$_{2.5}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;65 mg/m$^3$</td>
<td>12</td>
<td>22.60%</td>
</tr>
<tr>
<td>≥65 mg/m$^3$</td>
<td>41</td>
<td>77.40%</td>
</tr>
<tr>
<td>SOD enzymatic concentration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥84.40 U/mL</td>
<td>26</td>
<td>49.10%</td>
</tr>
<tr>
<td>&lt;84.40 U/mL</td>
<td>27</td>
<td>50.90%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 28 years</td>
<td>15</td>
<td>28.22%</td>
</tr>
<tr>
<td>≥ 28 years</td>
<td>38</td>
<td>71.78%</td>
</tr>
<tr>
<td>Working status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1 (not in contact with the mixer truck)</td>
<td>23</td>
<td>43.40%</td>
</tr>
<tr>
<td>Group 2 (in contact with the mixer truck)</td>
<td>30</td>
<td>56.60%</td>
</tr>
<tr>
<td>Length of employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3 years</td>
<td>19</td>
<td>35.80%</td>
</tr>
<tr>
<td>≥3 years</td>
<td>34</td>
<td>64.20%</td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>11</td>
<td>20.80%</td>
</tr>
</tbody>
</table>
Based on Table 3, the number of subjects that received PM$_{2.5}$ exposure ≥65 mg/m$^3$ is 77.40%. Furthermore, the percentage of subjects who had SOD value below 84.4 U/mL is about 49.10%. There were 38% of the subjects who were 28 years of age or older. The SOD level in human blood starts to decrease with age at 28 years old. The percentage of subjects who consumed approximately 35 portions of vegetables and fruit in a week was 54.70%.

### Table 4. Correlation of SOD Concentration with PM$_{2.5}$ Exposure and Workers’ Characteristic

<table>
<thead>
<tr>
<th>Variables</th>
<th>SOD (U/mL)</th>
<th>Total</th>
<th>OR (95%CI)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥84.4</td>
<td>&lt;84.4</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;65 mg/m$^3$</td>
<td>10</td>
<td>83.3</td>
<td>2</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>(1.37–36.40)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥65 mg/m$^3$</td>
<td>17</td>
<td>41.5</td>
<td>24</td>
<td>51.0</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;28 years</td>
<td>6</td>
<td>40.2</td>
<td>9</td>
<td>60.0</td>
</tr>
<tr>
<td></td>
<td>(0.16–1.82)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥28 years</td>
<td>21</td>
<td>55.3</td>
<td>17</td>
<td>44.7</td>
</tr>
<tr>
<td>Working status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1</td>
<td>13</td>
<td>59.1</td>
<td>9</td>
<td>40.9</td>
</tr>
<tr>
<td></td>
<td>(0.58–5.30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>14</td>
<td>45.2</td>
<td>17</td>
<td>54.8</td>
</tr>
<tr>
<td>Length of employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3 years</td>
<td>6</td>
<td>31.6</td>
<td>13</td>
<td>68.4</td>
</tr>
<tr>
<td></td>
<td>(0.09–0.94)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥3 years</td>
<td>21</td>
<td>61.8</td>
<td>13</td>
<td>38.2</td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>63.6</td>
<td>4</td>
<td>36.4</td>
</tr>
<tr>
<td></td>
<td>(0.49–7.57)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>45.2</td>
<td>22</td>
<td>54.8</td>
</tr>
<tr>
<td>Vegetable and fruit consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sufficient</td>
<td>12</td>
<td>45.8</td>
<td>12</td>
<td>54.2</td>
</tr>
<tr>
<td></td>
<td>(0.32–2.75)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not sufficient</td>
<td>15</td>
<td>51.7</td>
<td>14</td>
<td>48.3</td>
</tr>
<tr>
<td>BMI ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>14</td>
<td>50.0</td>
<td>12</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>(0.43–3.70)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not normal</td>
<td>13</td>
<td>48.1</td>
<td>14</td>
<td>51.9</td>
</tr>
</tbody>
</table>

By chi-square test, as shown in Table 4, we obtained the p-value of 0.03 for the correlation between PM$_{2.5}$ exposure and SOD concentration. Statistically, there is a significant difference in SOD concentration in workers.
exposed to PM$_{2.5}$, 65 mg/m$^3$ and <65 mg/m$^3$.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coeff.B</th>
<th>p-value</th>
<th>Odd ratio</th>
<th>95%CI Lower</th>
<th>95%CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM$_{2.5}$</td>
<td>2.319</td>
<td>0.029</td>
<td>10.165</td>
<td>1.276</td>
<td>80.994</td>
</tr>
<tr>
<td>Working status</td>
<td>-0.714</td>
<td>0.373</td>
<td>0.490</td>
<td>0.102</td>
<td>2.359</td>
</tr>
<tr>
<td>Length of employment</td>
<td>-1.074</td>
<td>0.095</td>
<td>0.342</td>
<td>0.097</td>
<td>1.204</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.769</td>
<td>0.401</td>
<td>0.463</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Multivariate regression was conducted as shown in Table 5, it can be concluded that workers who received PM$_{2.5}$ exposure of more than 65 mg/m$^3$ in the batching plant were at ten times higher risk of having the SOD concentration below 84.4 U/mL than those who received PM$_{2.5}$ exposure below 65 mg/m$^3$.

**DISCUSSION**

The deposition of particulate matter in human respiratory tract depends on the size of the particles: larger particles are deposited in the upper respiratory tract, while smaller particles penetrate deep into the alveolar spaces $^{19}$. PM$_{2.5}$ as an external factor produces free radicals in the body and brings about the oxidative stress. They trigger the forming of free radicals, such as superoxide anion. The metal content of PM$_{2.5}$ acts as an electron donor. Superoxide anion creates a signal to the body to produce a large amount of SOD enzymatic antioxidants. If there is an imbalance between prooxidants and antioxidants due to increased ROS (from chronic exposure), pathological reactions appear and cause various diseases, such as chronic obstructive pulmonary disease $^{20}$.

Daily workplaces are related to the decrease of SOD concentration. The percentage of workers in Group 2 who had SOD concentration below 84.4 U/mL was 60%, and these people were technicians, waste operators, and drivers. Stockpile area was the highest concentration place that may be caused by some ready-mix concrete activities, such as material unloading, material reversal, and mobilization of back-haw vehicles.

The workers need to consume a sufficient amount of vegetables and fruits to provide themselves with exogenous nutritional sources which can improve health by controlling free radicals. Some research found that changes in moisture content during storage, cooking, and processing stages can misrepresent changes in nutrient content $^{21}$. Steamed vegetables have better texture quality than boiled ones, whereas boiled vegetables show limited discoloration $^{22}$.

Increased physical activity is believed to increase energy expenditure beyond dietary intake that results in weight loss. In view of this, workers can be directed to adjust their BMI ratio to the normal category by performing a healthier lifestyle, such as doing physical activity, consuming more vegetables and fruits, and checking their health regularly $^{23}$.

A long-term exposure of PM$_{2.5}$ forms a ROS accumulation that triggers the DNA signal to initiate the production of SOD enzymes, which leads to a lower level of SOD concentration than that in humans who are slightly exposed to PM$_{2.5}$. Long-term exposure of PM$_{2.5}$ with a ten times higher dose leads to a decrease in SOD and glutathione peroxide concentration and an increase in malondialdehyde concentration in blood $^{24}$.

Good technologies and management systems are the best ways to resolve the dust problem in stockpile, central mixer, conveyor, and workshop areas $^{25}$. Relevant organizations should establish their hazard identification procedures and prepare a work plan by applying the hierarchy of controls.

**CONCLUSION**

There is a significant correlation between PM$_{2.5}$ exposure and SOD concentration in blood, so it is necessary to take preventive actions in a ready-mix concrete plant to prevent diseases in workers. This research specifically deals with the issue of PM$_{2.5}$.
pollution and SOD enzymes antioxidant in workers at a ready-mix concrete plant that can serve as an early detection signal for the workers.

Acknowledgment: This study was supported by PITTA research grant from Universitas Indonesia under the document number 2210/UN2.R3.1/HKP.05.00/2018. We would like to express our great thanks to all research subjects and the management of PT. X. The authors declare that there is no conflict of interests.

REFERENCES


5. Gatot S. Content of elements in PM$_{10}$ and PM$_{2.5}$ dust in cement factory, Bogor and in residence area by using X-Ray Fluorescence (XRF). Proceeding of the 6th National Seminar on Neutron and X-Ray Scattering. 2005;ISSN 1410-7686.


19. Domej W. Oetti K. Renner W. Oxidative stress and free radicals in COPD – implications and relevance


Association between PM$_{2.5}$ and Oxidative Stress Using Malondialdehyde Biomarker among Workers in a Concrete Batching Plant in 2018

Ema Fiki Munaya$^1$, Umar Fahmi Achmadi$^2$, Budi Hartono$^3$, I Made Djaja$^2$, Doni Hikmat Ramdhan$^3$

$^1$Student Faculty of Public Health, $^2$Professor in Environmental Health Study, Faculty of Public Health, $^3$Lecturer in Faculty of Public Health, Universitas of Indonesia, Depok, Indonesia

ABSTRACT

**Background:** Severe air pollution has affected the health of individuals both nationally and globally. The dangerous pollutant PM$_{2.5}$ could trigger oxidative damage, which has been widely studied in relation to health problems, such as lung cancer, chronic obstructive pulmonary, and cardiovascular diseases. Malondialdehyde (MDA), which is a secondary product of the lipid peroxidation of polyunsaturated fatty acids, is a marker of oxidative stress.

**Objective:** This study aims to analyze the association between PM$_{2.5}$ and MDA concentration in concrete batching plant workers as a population at risk of dust pollution.

**Material & Method:** This research was conducted in April–May 2018 with a cross-sectional method involving 53 samples of workers chosen by simple random sampling. Beside PM$_{2.5}$ and MDA concentration, other variables including smoking status, supplement consumption, age, physical activity, body mass index, years of work, and rotational shift working were also studied.

**Results:** The results indicated a significant correlation of PM$_{2.5}$ and age with MDA concentrations in concrete batching plant workers. $P$ value between PM$_{2.5}$ and MDA concentration was 0.025 with OR 15,791 CI (1,410-176,833). These findings suggest that exposure to PM$_{2.5}$ leads to oxidative stress as evidenced by MDA concentration.

**Keywords:** PM$_{2.5}$, oxidative stress, malondialdehyde (MDA), concrete batching plant, industry, age.

INTRODUCTION

Ambient air quality is one of the major factors affecting human health at both the global and the national level. An estimated 72 percent of premature deaths are caused by ischemic heart disease, 14 percent by chronic obstructive pulmonary disease or lower respiratory tract infections, and 14 percent by lung cancer related to air pollution.$^1$ Compared to other pollutants, particulate meters (PM) are the most dangerous for human health. The toxicity characteristics of PM$_{2.5}$ are related to metal and organic components that are absorbed into the particles or constitute the PM$_{2.5}$ formers themselves as well as the biological components, sulfates, nitrates, acidity, and reactive gases absorbed by the surface of particles such as O$_3$.$^2$ Research has shown associations between health effects and PM$_{2.5}$-forming components, such as iron, nickel, zinc, ammonium nitrate, carbon elements, organic carbon, nitrates, and sulfates.$^3$

Air pollution due to high PM$_{2.5}$ levels has been associated with increasing incidences of

Corresponding author:
Umar Fahmi Achmadi, Prof, dr, M.Ph,PhD
Professor in Environmental Health Study, Faculty of Public Health, Universitas Indonesia

E-mail: ufahmi@ui.ac.id
Mobile: +62816815794
respiratory diseases, such as lung cancer, chronic obstructive pulmonary disease (COPD), and cardiovascular disease. In animal experiments, air pollution has been shown to induce oxidative stress. Epidemiological studies have also indicated an association between exposure to air pollution in urban areas and oxidative stress in bus drivers. Malondialdehyde (MDA) is a secondary product of polyunsaturated fatty acid (PUFA) oxidation, which determines the degree of lipid peroxidation used as an oxidative stress biomarker. Research showed an association between particulate dust levels and the incidence of oxidative stress in school students in China, as evidenced by MDA levels in urine. Another study also proved that MDA levels in urine of children living in industrialized areas were higher than those of children living in non-industrial areas. Weiwei Lin et al. in Beijing identified associations between pollutant concentrations of CO\(_2\), PM\(_{2.5}\), SO\(_2\), NO\(_2\), and CH with MDA concentrations in the urine of schoolchildren.

Research has shown that workers are the population at risk of COPD or cardiovascular diseases due to exposure to PM\(_{2.5}\) in their working environment. Concrete batching plants and ready mix plants produce concrete for large-scale construction. Concrete batching plants with poor settings and controls can pollute the surrounding environment with wastewater, dust, and noise. This study aims to analyze the association between PM\(_{2.5}\) exposure and oxidative stress using the MDA biomarker among workers in a concrete batching plant. In addition, this study also investigates other factors of MDA concentration consisting of smoking status, supplement consumption, age, physical activity, body mass index, years of work, and rotational shift working.

**MATERIALS AND METHOD**

a. Study Design

This research was carried out in a concrete or ready mix batching plant in Jakarta, Indonesia with cross-sectional study on April 2018. A total of 53 workers were selected using simple random sampling and calculated based on the average difference hypothesis test formula. The inclusion criteria were that each participant must be 18–55 years old, one who worked in the position as his or her main job, and a willing research respondent who signed an informed consent.

b. Sample Collection and Analysis

Blood samples were collected by certified phlebotomy nurses from a certified laboratory, using anti-coagulant EDTA in the batching plant before being carried to laboratory for analysis. The plasmas were then separated from other parts of blood and reacted using thiobarbituric acid (TBA) as a catalyst which brought in pink-color substance that could be read by spectrophotometry 532 nm wavelength.

c. PM\(_{2.5}\) Exposure and Other Variables

The concentration of PM\(_{2.5}\) was measured in the ambient air of the working environment. There are five air sampling points consisting of point 1 (stockpile), point 2 (central mixer and silo), point 3 (lab, workshop, and waste treatment), point 4 (gate and parking lot), and point 5 (the office). High Volume Air Sampler (HVAS) was used for the measurement of outdoor-based air samples and Haz Dust EPAM 5000 for indoor-based air samples. Calculation of PM\(_{2.5}\) concentration was performed using the gravimetry method for HVAS and direct reading for Haz Dust EPAM 5000. Air sampling was carried out twice at every point for one hour on the day and one hour at night. Other factors of MDA concentration consisting of smoking status, supplement consumption, age, physical activity, body mass index, years of work, and rotational shift working were assessed using questionnaires.

d. Statistical Analysis

We analyzed the concentration of PM\(_{2.5}\) in μg/m\(^3\). The comparison of MDA concentration between workers who worked in the high and low levels of PM\(_{2.5}\) was shown. The final model of analysis involving multivariate logistic regression and using SPSS 22nd version was conducted to understand the association between PM\(_{2.5}\), MDA concentration and other factors consisting of smoking status, supplement consumption, age, physical activity, body mass index, years of work, and rotational shift.

**RESULTS**

Based on the respondents’ distribution, the concentration of PM\(_{2.5}\) was not normally distributed with the median value of 113.35 μg/m\(^3\) and the standard
deviation of 30.27. The minimum value of PM$_{2.5}$ inhaled by respondents was 46.75 μg/m$^3$, while the maximum was 129.05 or 95%. 95% CI assumed that the concentration of PM$_{2.5}$ dust in the batching plant of PT X was 93.01–109.70 μg/m$^3$. The average concentration of MDA was 0.264 nmol/mL with the variation of 0.048 nmol/mL. The lowest concentration of MDA was 0.176 nmol/mL, while the highest was 0.351 nmol/mL. These results showed that 95% of respondents had MDA concentrations in blood of 0.251 to 0.277 nmol/mL (Table 1).

### Table 1 Distribution of Respondents by PM$_{2.5}$ and MDA Concentration in Concrete Batching Plant

<table>
<thead>
<tr>
<th>Variable</th>
<th>Average</th>
<th>Standard Deviation</th>
<th>Min-Max</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM$_{2.5}$ Concentration</td>
<td>113.35 μg/m$^3$</td>
<td>30.27</td>
<td>46.75–129.05</td>
<td>93.01–109.70</td>
</tr>
<tr>
<td>MDA Concentration</td>
<td>0.264 nmol/mL</td>
<td>.048</td>
<td>0.176–0.351</td>
<td>0.251–0.277</td>
</tr>
</tbody>
</table>

For further analysis, PM$_{2.5}$ concentrations were categorized based on the Indonesian regulation concerning air pollution which sets the maximum concentration of PM$_{2.5}$ at 65 μg/m$^3$. MDA concentrations were to be categorized according to the mean into two groups consisting of below average and above average. MDA was below average if the concentration is 0–0.263 and above average if the concentration is 0.264 or more (Table 2).

Chi-square test was performed to see the relationship between MDA variables and various independent variables including PM$_{2.5}$ concentrations, smoking status, supplement consumption, age, physical activity, body mass index, years of work, and rotational shift. This analysis shows that only PM$_{2.5}$ concentration and age were significantly related to MDA concentration with p-value of under 0.05.

### Table 2 MDA Concentration in Respondents by PM$_{2.5}$ Concentration and Age

<table>
<thead>
<tr>
<th>Variables</th>
<th>MDA Concentration</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;0.264 nmol/ML</td>
<td>≥0.264 nmol/ML</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>N     %</td>
<td>N     %</td>
<td>N     %</td>
</tr>
<tr>
<td>PM$_{2.5}$ concentration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 65 μg/m$^3$</td>
<td>24   58.5</td>
<td>17   41.5</td>
<td>41   100</td>
</tr>
<tr>
<td>≤ 65 μg/m$^3$</td>
<td>2    16.7</td>
<td>10   83.3</td>
<td>12   100</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 28 years old</td>
<td>22   57.9</td>
<td>16   42.1</td>
<td>38   100</td>
</tr>
<tr>
<td>&lt; 28 years old</td>
<td>4    26.7</td>
<td>11   73.3</td>
<td>15   100</td>
</tr>
</tbody>
</table>

The last analysis was done in multivariate logistic regression. This modeling aims to validate the relationship of one major variable with the dependent variable by controlling some confounding variables. It can be explained that workers who breathe PM$_{2.5}$ air at work points that do not meet the quality standard are 15.791 times more likely to have MDA concentrations above average after being controlled by age, body mass index, and work shift (Table 3).
Table 3 Multivariate Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>β</th>
<th>p-value</th>
<th>OR</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM$_{2.5}$ concentration</td>
<td>2.759</td>
<td>0.025</td>
<td>15.791</td>
<td>1.410</td>
<td>176.833</td>
</tr>
<tr>
<td>Age</td>
<td>1.629</td>
<td>0.032</td>
<td>5.096</td>
<td>1.149</td>
<td>22.603</td>
</tr>
<tr>
<td>Shift rotation</td>
<td>-0.399</td>
<td>0.706</td>
<td>0.671</td>
<td>0.084</td>
<td>5.333</td>
</tr>
<tr>
<td>Body mass index</td>
<td>0.541</td>
<td>0.407</td>
<td>1.771</td>
<td>0.458</td>
<td>6.839</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.355</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

This study, whose design involves twofold measurement of PM$_{2.5}$, found a high level of PM$_{2.5}$. Referring to the Indonesian regulation concerning air pollution, the maximum concentration of PM$_{2.5}$ was set at 65 μg/m$^3$ for outdoor areas. There was a significant concentration difference between indoor-based and outdoor-based areas. Indoor-based concentration of PM$_{2.5}$ was below the maximum value. PM$_{2.5}$ concentration becomes the most determining factor in MDA concentration. However, the relationship between PM$_{2.5}$ and MDA concentration is also controlled by age. Age is one of the factors associated with oxidative stress. Some studies with biomarkers like MDA, isopGF2α, GPx, GSH-Px showed a significant association between age and concentration of biomarkers in either the blood or urine. In line with the research by Bolzani et al., this study showed there is a significant relationship between MDA and respondents’ age. The presence of higher MDA concentrations in individuals aged 28 years or more may be associated with a decline in SOD that is used as an antioxidant. Biologically, age is a complex concept that basically refers to the physiological capacity and physiological reserves of organs and systems within an individual. This physiological capacity decreases with age. According to the Environment Protection Authority of Australia, several potential sources of air pollution from the concrete batching plant are the delivery of raw materials in trucks, trailers and tankers, storage of raw materials in bunkers and stockpiles, raw material transfer at the front end of loaders, conveyors, wagons, and agitators as well as leakage or spillage of raw materials from silos, inspection cover and channel wor. Concrete raw material consisting of aggregate, cement, and fly ashes is the main cause of the high-level PM$_{2.5}$. A study by Ayse Orman et al. conducted at a cement plant showed that field workers exposed to cement dust directly had higher MDA concentrations than office workers. Other studies also showed that PM$_{2.5}$ concentrations are related to MDA concentrations in the urine or in the blood both in children and in adults.  

Higher MDA concentration in workers exposed to PM$_{2.5}$ may be due to the presence of metals which are the components of the PM$_{2.5}$ themselves in the batching plant. The metal compositions present in the particulates Cr, Co, Ni, Mn, Zn, V, Cu, and especially Fe and Aromatic Poly Hydrocarbons (PAHs) which are the main compositions of particulates and may lead to additive or synergetic interactions with the particle surface area. Either stand-alone or together, the chemical and physical characteristics of PAH and metals can produce reactive oxygen species (ROS) and oxidative stress. Research suggests that silica particles derived from cement or fly ash in the batching plant can induce ROS that controls antioxidant defenses in the lungs and causes lipid peroxidation and cell damage. Among the different aldehydes that can be formed as a secondary product of fat destruction, Malondialdehyde (MDA) is one of the most mutagenic products of toxic fat peroxidation. The higher the MDA in a person, the worse the oxidative stress is found in the person. This is related to the adverse health consequences for that person.

CONCLUSION

This study proves that the concentration of PM$_{2.5}$ is the biggest risk factor associated with MDA concentration of workers in the concrete batching plant.

Acknowledgment: This study was supported by Universitas Indonesia through PITTA grant number
We are grateful to all research subjects and the management team of the concrete batching plant.

**Ethical approval:** This research’s ethical approval number granted by the Ethical Research Committee is 282/UN2/F10/PPM/00.02/2018 dated 17 April 2018.

**Competing Interest:** Researchers have no conflict of interest with any party.

**REFERENCES**


Teachers as Promoters of Sex Education among Adolescents with Mental Retardation

Hestilia Nurul Ma’rifah¹, Evi Martha¹
¹Faculty of Public Health, Universitas Indonesia

ABSTRACT

Adolescents with mental retardation have the right to receive health information including sex education. This study aims to obtain information about the sex education practices implemented by teachers at Special School-C Dharma Asih in Depok 2018. The study used a qualitative approach with Rapid Assessment Procedure (RAP) design. The research participant consisted of eight teachers, the headmaster, parents of student, a health promotion officer at the Depok Jaya Primary Health Care, and staff at Regional 2 Education Branch Office of West Java Province. The results showed that sex education was provided classically and incidentally at Special School-C Dharma Asih. The teachers not only had adequate knowledge of sex education but also believed that sex education should be given to adolescent with mental retardation as early as possible. The constraints faced by the teacher included the lack of a sex education module and educational tools that support sex education in schools. Schools do not have specific policies related to sex education of adolescents with mental retardation. Cooperation between teachers, parents, primary health care workers, and education offices has not been optimal for encouraging sex education. This study suggests that the involvement of all stakeholders in the development of special policies related to sex education for adolescents with mental retardation should be encouraged.

Keywords : Sexuality education, adolescents, mental retardation, teachers.

INTRODUCTION

The prevalence of mild, moderate and severe mental retardation world wise is estimated to be 2%, 1.5% and 0.3%, respectively. In Indonesia, the prevalence of mental retardation is 13.68%, amounting to 290,837 people.¹

Adolescents with mental retardation have a below-average intelligence level (IQ <70) that causes impairments in cognitive, language, motoric and social functions.² ³ However, they have same sexual drive as adolescents with normal development.⁴

Teachers can be promoters of sex education for adolescents with mental retardation. However, a lack of self-confidence in teaching about sex and the perceptions of sex education as a taboo can hamper the provision of comprehensive sex education.⁵ ⁶

No special curriculum for sex education exists in Indonesia. The provision of sex education in school is still integrated with several subjects, such as natural sciences, religion, citizenship, and physical, sports and health.⁷ ⁸ Sex education is also incidentally delivered because teachers do not have sex education-related modules or special guidelines.⁹

Training for teachers on sex education is still very limited, whereas training on pre-education can improve a teacher’s initiative in providing sex education.¹⁰ ¹¹

Based on this background, this study aims to obtain extensive information on the sex education practices that have been carried out by teachers at the school for the disabled, Special School-C Dharma Asih, in Depok.
MATERIALS AND METHOD

This qualitative study applied a Rapid Assessment Procedure (RAP) design at Special School-C Dharma Asih in Depok, in May-June 2018. Data collected through in-depth interviews and observation. The analysis method used was thematic analysis. Data validity was assessed by triangulation of the source, method, and data.

RESULTS

Knowledge

Results of study indicated that almost all teachers had adequate knowledge of sex education. Only one teacher considered sex education to be related to sexual intercourse.

Several aims of sex education were conveyed by teachers, such as protecting children from sexual abuse, guiding children based on norms, and enhancing children’s skills of taking care of and maintaining their reproductive health.

The teachers were also aware that children with mental retardation enter the adolescent period at the age of 13-15 years. In female adolescents, some of the physical changes that occur are menstruation, breast growth and hip enlargement. Male adolescents, on the other hand, experience physical changes, such as wet dreams, voice change, moustache growth, and the emergence of Adam’s apple. Children with mental retardation who begin to enter puberty often show aggressive behaviour at school, such as demonstrating emotions that are difficult to control, gazing at someone for a prolonged period, getting physically close to someone, poking, hugging someone suddenly, and masturbating in public.

Perception

Almost all teachers thought that adolescents with mental retardation need sex education because parents do not necessarily provide sex education at home. Almost all teachers felt confident when delivering sex education.

Nevertheless, one teacher thought that sex education does not need to be delivered comprehensively because it is considered taboo and would encourage the adolescents to exhibit deviant behaviours.

Supporting Facilities

Supporting facilities are important for enhancing the effective provision of sex education for adolescents with mental retardation. The tools often used by teachers are pictures, both printed and digital, displayed through InFocus or accessed directly through mobile phones. In this study, one teacher taught certain sex education materials through direct demonstrations. This approach is considered to be more casual, allowing the children to feel more open and less shy.

The teachers did not have sex education modules available for use. All teachers thought that module provision is important for facilitating the systemic provision of sex education.

This study observed that Special School-C Dharma Asih had no supporting facilities like banner, posters or leaflets related to sex education. The walls in the school’s hallway were only used to display announcements, documents concerning the school’s activities, and some of the students’ crafts.

Sex Education-Related Program and Policy

Sex education-related program and policy are used to guarantee the continuity of sex education practices at schools. Unfortunately, the Education Office, schools, and Depok Jaya Primary Health Care have not developed any sex education-related programs and policies. The Education Office only deals with general curriculum-related programs, while sex education is under the responsibility of Social Affairs Office. Schools do not provide special programs because sex education is already integrated in the instruction of several related subjects, such as religion, citizenship, the natural sciences, and physical, sports and health. The Depok Jaya Primary Health Care’s reason for not implementing sex education programs is due to limited human resources, time, and funds.

Seminar and Training

Seminar and training are useful to improving the knowledge and skills of teachers in sex education. Some of the teachers said they had participated at a seminar on sex education in 2006 held by one of universities in Bandung. Other teachers said that they had not yet participated in sex education-related seminars and trainings. The teachers thought that the regular provision of trainings and seminars on sex education is required.
to increase their insight into sex related issues among adolescents with mental retardation.

According to the information given by the Primary Health Care in Depok, there was in fact a routine training held by the Education Office for the teachers responsible for teaching the health-related curriculum. Unfortunately, Special School-C Dharma Asih has not yet received the curriculum materials. As the Primary Health Care Centre has not yet proposed that special school for the disabled should participate in the training.

Sex Education Practice

Sex education was classically and incidentally delivered by the teachers based on the needs. Classically delivered sex education is integrated in the teaching several subjects. By contrast, incidentally delivered sex education was conducted on a case-by-case basis when adolescents behaved in sexually deviant ways, such as suddenly hugging someone, watching porn or masturbating at school.

The contents often taught in sex education involved an introduction to sexual organs and functions, sexual abuse prevention, sex hygiene, reproductive rights and the ways to making friends with the same and opposite sex. One exemplary aim was to ensure that the adolescents understood that they should not be engaged in a romantic relationship during their education and that they may get married later after graduation and get a job.

The methods often applied by the teachers while providing sex education were lectures and personal briefing given to the children. The use of these methods was adjusted according to the children’s needs. The lecture method was applied during class teaching, while the personal approach was applied when certain children exhibited deviant sexual behaviours.

Evaluation of the delivered materials was conducted by asking the adolescents about the information delivered and directly observing the changes in the adolescents’ attitudes and behaviours. In addition, several of the teachers performed the evaluation by asking parents about the adolescents’ behaviours at home.

DISCUSSION

Almost all teachers had adequate knowledge of sex education and the sexual development processes of adolescents with mental retardation. Sufficient knowledge will encourage a comprehensive sex education practice. Travers, Tincani, Whitby and Bououtot stated that before delivering sex education, the caregiver should have a good knowledge of the definitions and objectives of sex education, the concept of human development, the child’s personal ability, and sexual behaviours, and culture in the greater society.12

Nevertheless, there are still teachers who have misleading perceptions that sex education means the teaching of sexual intercourse. Sex education-related training for teachers at special schools for the disabled is still minimal. The results of this study showed that none of the teachers had participated in a sex education-related seminar or training within the last five years. This result was further corroborated by the statement of the officer at the Education Office that no sex education-related seminars or trainings for teachers at special schools for the disabled have been held by the office.

The lack of education and training for teachers at special schools for the disabled shows the low level of attention given by the government to the sex-related issues among adolescents with mental retardation. According to Nurse, training will improve the knowledge and ability to identify sexual problems, such as sexual abuse.11 Byrne, Rietdijk and Pickett mentioned that training on pre-education for teachers can elevate the teachers’ knowledge of sexual concepts, improve their pedagogical skills and enhance their comprehension of the methods of delivery.10

Despite the fact that the teachers consider sex education to be important for adolescents with mental retardation, no specific policy related to sex education in schools exists. Byrne, Rietdijk, and Pickett stated in their study that school policy is important for influencing the response and behaviour of teachers toward the practice of sex education.10

According to the United Nations Educational, Scientific and Cultural Organization, a teacher may experience some conflicts while delivering sex education. Some teachers may not be confident and may feel confused when handling sex-related issues. Therefore, teachers need guidelines that give a clear picture of what to teach and how to teach it.13

Sex education can be carried out classically, namely by integrating sex education materials into the teaching of several subjects. A study by Pakasi and Reni
showed that sex education-related materials in schools are provided especially in natural sciences, religious and physical, sports, and health classes. Tjasmini discussed an integrated sex education model, in which self-development programs teach several skills, such as bathing, teeth brushing, vulva hygiene during menstruation, toilet use, getting dressed, communication, and makeup application. A special curriculum for sex education is needed to make sex education more systematic.

Sex education can also be applied incidentally when adolescents show deviant sexual behaviors, such as suddenly hugging someone, watching porn videos or masturbating in class. According to Aziz, the teaching of sex education can be performed directly when the child is exhibiting a certain condition.

The contents taught in sex education at the school under study included an introduction to sexual functions and organs, the prevention of sexual abuse, sex hygiene, reproductive rights and ways to establish relationships with friends of the same and opposite sex. These materials were quite comprehensive. However, according to Aziz, some topics have not been taught by teachers, such as risky sexual behaviours, sexually transmitted infections (STIs) and human immunodeficiency virus and acquired immune deficiency syndrome (HIV/AIDS), abortion and contraception, even though they are also important for adolescents with mental retardation. Rosdami, Djaswadi and Sumarni asserted that the adolescents with less knowledge of reproductive health, STIs and HIV/AIDS, abortion, and contraception are susceptible to risky sexual behaviours.

Sex education materials are delivered gradually based on the needs and the ability of adolescents in receiving information. Tutar Güven and İşler thought that sex education must be adjusted according to the ability level of the adolescents with mental retardation. As it difficult for them to receive information, the sex education provided must be in an understandable language.

In practicing sex education, the teachers use instructional media in the form of high-quality printed images or digital images displayed through InFocus or directly accessed via tablets or mobile phones. The use of media is considered effective for enhancing the children’s comprehension of the information provided. Psychologically, children with mental retardation prefer learning through visual media rather than written media. In addition, Travers, Tincani, Whitby and Boutot pointed out that the use of media such as videos, images and diagrams, is effective for conveying sex-related information to children with special needs. A study by Palupi revealed children’s positive responses toward the development of animated videos for sex education, suggesting that children are more interested in watching animated videos of sex education than listening to lectures.

To determine whether the sex-related information has been relayed successfully, teachers conduct an evaluation by directly asking the adolescents with mental retardation about the materials delivered via several questions. Teachers also observe any changes in the adolescents’ attitudes and behaviours. Teachers even ask the parents about the adolescent’s behaviour at home as part of evaluation.

Teachers consider the parents’ involvement in sex education to be important, as the adolescents spend more time at home than at school. According to the International Planned Parenthood Federation, several of key players in the provision of sex education to adolescents with mental retardation include teachers, parents, peer educators, and service providers.

The absence of collaboration between stakeholders is one of the barriers that schools face in the practice of sex education. Collaboration is needed to ensure the delivery of comprehensive sex education. The groups that can effectively encourage the practice of sex education are teachers, parents, health workers, and academicians.

**CONCLUSION**

The teachers at Special School-C Dharma Asih had adequate knowledge of sex education. The teacher considered it important to provide sex education to adolescents with mental retardation as early as possible. The constraints faced by the teachers involved the lack of a sex education-related module and supporting facilities in the form of visual learning media to improve the practice of sex education at school. Schools need specific policies to encourage the sustainable practice of sex education. In addition, collaboration between teachers, the students’ parents, the Primary Health Care Centre and the Education Office is needed to establish
the provision of comprehensive sex education.

Conflict of Interest: There was no conflict of interest of this study.

Source of Funding by PITTA, Indonesia

Ethical Clearance: Ethical review was conducted in accordance with the procedures at the Faculty of Public Health of the Universitas Indonesia and was approved by the Health Research Ethics Committee of the Faculty of Public Health of the Universitas Indonesia

REFERENCES


Improper Use of Inhaler Technique in the Control of Asthma in Adult

Mustafa Neama¹, Hawaa Khalid Alwan²

¹M.B.ch.B, F.I.B.M.S. (Med), F.I.B.M.S. (Res). Department of Medicine-Baghdad Teaching Hospital/ University of Baghdad-College of Medicine, ²MBChB, the Ministry of Health, Iraq, Dyala

ABSTRACT

Background: Asthma is a chronic inflammatory disease of the airways in which they are involved a lot of cells and elements cellular and that in susceptible individuals causes recurrent episodes of wheezing, shortness of breath when breathing, feeling tightness of chest and cough. Aim of the study: To assess the asthmatic patient’s inhaler use technique, any error if present. Patients and method: A cross sectional study conducted in consulting respiratory unit in Baghdad teaching hospital from the 1st of July 2017 to the end of February 2018. Results: Device preparing errors was present in 47.2% of asthmatic patients, failure to exhale before inhalation was present in 80.2% of patients, exhalation during inhalation was present in 10% of patients, short inhalation time was present in 51.7% of patients, not rinsing mouth with water after inhalation was present in 85.5% of patients and repetition more than recommended was present in 22.8%. Conclusions: There is error in using the asthmatic inhalers treatment technique.

Keyword: Asthma, inhaler, device

INTRODUCTION

The concept of asthma has been evolutionary. Until 1975 it is considered that asthma is produced by a contraction of the bronchi; With the advent of fibrobronchoscropy and bronchoalveolar lavage, it was discovered that there is also chronic inflammation of the airway, which generates the symptoms; later, the progress in the techniques of bronchial biopsy with which it will be recognized and created in the 1990s, in the sense that the disease is reversible. Remodeling of the airway secondary to chronic repetitive inflammation, which explains that over time, the uncontrolled asthmatic patient has persistent obstruction.¹

Due to its multifactorial etiology, respiratory functional alterations and its diverse clinical expressions, according to the age of presentation, there is no definition that completely describes this entity. Therefore, defining asthma is complex, since it is a multifactorial disease (etiology, morphological characteristics, functional changes and clinical manifestations), in which there is an interaction between the immune system and the autonomic nervous system. However, the most complete definition is that which takes into account both the functional and the cellular point of view, that is why the definition that best adapts is that proposed by the Global Initiative for Asthma (GINA 2006), ² that proposes asthma as a chronic inflammatory disease of the airways, in which many cells and cell products play an important role. Chronic inflammation produces an increase in airway reactivity and recurrent episodes of wheezing, respiratory distress, intercostal retractions, coughing and chest tightness, especially at night and in the morning.³ These episodes are associated with airflow obstruction, reversible spontaneously or with treatment. Inflammation also causes an increase in the bronchial response to a wide variety of stimuli. Thus, in all cases it is emphasized that asthma is a chronic inflammatory alteration of the airways, which can be associated in an acute or chronic way. with airflow limitation as a result of bronchoconstriction, edema, mucous secretion, inflammation and, in some patients, remodeling of the airways. The remodeling of the airway corresponds to those structural changes characterized by thickening of the reticular lamina with deposits of subepithelial and perivascular fibrin, hyperplasia of the mucous glands, smooth muscle and vascular. This determines the thickening of the wall of

DOI Number: 10.5958/0976-5506.2019.00316.4
the bronchi of greater conduction (accessible to their study by mucosal biopsy) and also in the small airway (accessible by bronchoalveolar lavage). (4)

**Epidemiology**

The prevalence of asthma varies according to the geographical area, climate, lifestyle and economic development of each region. (5) The World Health Organization (WHO) estimates that it affects 300 million people and even today It is the cause of death worldwide, estimating 250,000 asthma deaths per year. (2) In the last four decades, the prevalence increased significantly, mainly in industrialized cities. (6) However, in the last 10 years prevalence has been established, plateau, where despite remaining high, no increases have been reported.

Epidemiological studies are being carried out throughout the world, predominantly cross-sectional, in order to determine the prevalence of asthma and its tendency. Thus, in 1991, the International Study of Asthma and Allergies in Childhood (ISAAC = International Study of Asthma and Allergies in Children) was created, together with the European Community Respiratory Health Survey (ECR-HS = European Community of Respiratory Health), Studying young adult population, have determined that countries such as United States of America, Canada, United Kingdom, New Zealand and Australia have higher prevalences, while the lowest are in China, India, Ethiopia, Indonesia and Eastern Europe. The ISAAC and the ECRHS show a great variability in the spatial distribution of asthma. Epidemiological studies in Latin America have revealed differences in the prevalence of asthma, with figures from 5.7 to 16.5% in the pediatric population. (7)

Industrialized countries and urban areas are among risk factors of the disease. (8) The current reported prevalence in the Middle East region is somewhat lower, varying between 5.6% in Saudi Arabia and 8.5% in Kuwait. In Iraq, approximately 200,000 patients per year with asthma are either hospitalized or treated in an Emergency Room. (8)

**Etiology and classification**

Attempts have been made to classify asthma according to its causes, intensity and obstruction of the airway valued by the maximum expiratory volume at the end of the first second (FEV1) or peak expiratory peak (PEF) and its response to management. This is not appropriate, since asthma is multifactorial and both genetic and environmental factors contribute. Previously, asthma was classified as extrinsic, which had an allergic component, and in intrinsic asthma, which represented a group of patients where there was no justified cause and with negative allergy laboratory tests. Asthma can be classified by etiological factors, severity or type of airflow limitation. Given that it is a heterogeneous disease, there are multiple causal factors both for its induction and for its exacerbation, from viral infections in childhood to occupational exposure in adults. Severity is estimated by a combined evaluation of symptoms, amount of beta two bronchodilator agonists (β2) to control symptoms and lung function. (9)

**Classification based on severity**

In this type a series of variables are grouped which include:

a) The frequency of symptoms during the day and night,

b) Its repercussion in the daily activities carried out during the day and night,

c) The use, number of times and the dose in which β2 agonist is used to treat the symptoms and

d) Lung function.

This classification is useful, since it relates the inflammation of the airway with the clinic and with the indexes of severity of symptoms according to the intensity of the asthma. In addition, it links the clinical data with the degree of obstruction of the airway and the variability of the Para clinical parameters that measure this obstruction (FEV1 or PEF). In this way, chronic asthma has been subdivided into: mild intermittent, mild persistent, moderate persistent and severe persistent. The advantage of this type of classification is that in a practical way it allows to start treatment based on the severity and establish, later, a treatment plan according to the control and stabilization of symptoms. It has been proposed by the National Program of Education for Asthma (NAEPP). Thus, the severity of patients with asthma can be classified in one of these four steps before treatment and during the monitoring of it. If the asthma control is maintained, the degree of asthma is reclassified and another management is installed according to the intensity. (10)
METHOD

Study design and study setting:

A cross-sectional study conducted in consulting respiratory unit in Baghdad teaching hospital from the 1st of July 2017 to the end of February 2018.

Patients:

A total of 400 adults with persistent asthma for at least 6 months duration, and agreeing to the Global Initiative for Asthma criteria, the patients within the age ≥18 years old and who had received at least one dose of inhaled corticosteroids and long-acting beta-2 agonists, either in separate or fixed combinations, irrespective of pharmacologic agent(s).

Data Collection

The data were collected by using a specially designed questionnaire form. At first socio-characteristics (age, on age, sex, education, occupation, current therapies, outcome measures of asthmatic patient’s treatment and inhaler technique) of the patients were collected

Statistical Analysis

The analyses were conducted with statistical package for social science IBM-software (SPSS 22). Data are expressed as mean ± SD or number and percent.

Results:

A total of 400 adult asthmatic patients with mean age of 42.7±13.3 years. The inhaler types constituted MDI with spacer (2.5%), MDI (79%), Diskus (0.8%), Turbuhaler (5.2%), MDI & Turbuhaler (11.5%) and MDI & Diskus (1%). (Figure 1)

Device preparing errors was present in 47.2% of asthmatic patients, failure to exhale before inhalation was present in 80.2% of patients, exhalation during inhalation was present in 10% of patients, short inhalation time was present in 51.7% of patients, not rinsing mouth with water after inhalation was present in 85.5% of patients and repetition more than recommended was present in 22.8% of asthmatic patients. (Table 1)

There was a highly significant association between daytime symptoms > 2/weeks and Diskus inhaler type (p<0.001). A highly significant association was observed between bronchodilator need and MDI with spacer type (p<0.001). There was a highly significant association between night waking and Diskus inhaler type (p<0.001). A highly significant association was observed between activity limitation and MDI type (p<0.001). There was a highly significant association between well controlled
onset and MDI with spacer type (p<0.001). (Table 2)

Table 1: Main errors when patients used inhaler.

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Device preparing errors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>189</td>
<td>47.2</td>
</tr>
<tr>
<td>No</td>
<td>211</td>
<td>52.8</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Failure to exhale before inhalation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>321</td>
<td>80.2</td>
</tr>
<tr>
<td>No</td>
<td>79</td>
<td>19.8</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Exhalation during inhalation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>40</td>
<td>10.0</td>
</tr>
<tr>
<td>No</td>
<td>360</td>
<td>90.0</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Short inhalation time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>207</td>
<td>51.7</td>
</tr>
<tr>
<td>No</td>
<td>193</td>
<td>48.3</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Failure of the patients to hold breath for 5-10 seconds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>272</td>
<td>68.0</td>
</tr>
<tr>
<td>No</td>
<td>128</td>
<td>32.0</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Do not rinse mouth with water after inhalation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>342</td>
<td>85.5</td>
</tr>
<tr>
<td>No</td>
<td>58</td>
<td>14.5</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Repetition more than recommended</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>91</td>
<td>22.8</td>
</tr>
<tr>
<td>No</td>
<td>309</td>
<td>77.2</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 2: Distribution of clinical characteristics according to inhaler types.

<table>
<thead>
<tr>
<th>Variable</th>
<th>MDI &amp; spacer</th>
<th>MDI</th>
<th>Diskus</th>
<th>Turbuhaler</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Daytime symptoms more than twice a week</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>-</td>
<td>313</td>
<td>99.1</td>
<td>7</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>100.0</td>
<td>3</td>
<td>0.9</td>
<td>0</td>
</tr>
<tr>
<td>Bronchodilator need more than twice a week</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>100.0</td>
<td>306</td>
<td>96.8</td>
<td>7</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>-</td>
<td>10</td>
<td>3.2</td>
<td>0</td>
</tr>
<tr>
<td>Night waking due to asthma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>-</td>
<td>175</td>
<td>55.4</td>
<td>7</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>100.0</td>
<td>141</td>
<td>44.6</td>
<td>0</td>
</tr>
<tr>
<td>Activity limitation due to asthma symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>-</td>
<td>194</td>
<td>61.4</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>100.0</td>
<td>122</td>
<td>38.6</td>
<td>3</td>
</tr>
<tr>
<td>Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well controlled</td>
<td>10</td>
<td>100.0</td>
<td>3</td>
<td>.9</td>
<td>0</td>
</tr>
<tr>
<td>Partially controlled</td>
<td>0</td>
<td>-</td>
<td>85</td>
<td>26.9</td>
<td>0</td>
</tr>
<tr>
<td>Non controlled</td>
<td>0</td>
<td>-</td>
<td>228</td>
<td>72.2</td>
<td>7</td>
</tr>
</tbody>
</table>

*Fishers exact test, S=Significant.

Highly significant association between device preparing errors and MDI inhaler type (p<0.001), between short inhalation time and Diskus inhaler type (p<0.001), Failure to hold breath for 5-10 seconds among patients used MDI inhaler type (p<0.001), Failure to exhale before inhalation was significantly higher among patients used MDI inhaler type (p<0.001). Exhalation during inhalation was significantly higher among patients used MDI inhaler type (p=0.008). (Table 3)

Table 3: Distribution of outcome measures according to inhaler types.

<table>
<thead>
<tr>
<th>Variable</th>
<th>MDI &amp; spacer</th>
<th>MDI</th>
<th>Diskus</th>
<th>Turbuhaler</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Devise preparing errors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>-</td>
<td>170</td>
<td>53.8</td>
<td>0</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>100.0</td>
<td>146</td>
<td>46.2</td>
<td>7</td>
</tr>
<tr>
<td>Failure to exhale before inhalation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>-</td>
<td>287</td>
<td>90.8</td>
<td>3</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>100.0</td>
<td>29</td>
<td>9.2</td>
<td>4</td>
</tr>
</tbody>
</table>
**DISCUSSION**

In the current study the main inhaler used was MDI with mainly used error than other types, and this type lead to critical error which is mentioned by Price D et al, \(^{(11)}\) as followling (Failure to remove the cap, not holding the inhaler upright, actuation not corresponding to inhalation; actuation before inhalation, actuation not corresponding to inhalation; actuation is too late (Puff 1), failure to actuate, failure to inhale, inhale too fast, inhalation through the nose). Westerik JA et al, \(^{(12)}\) found that errors in Diskus inhaler technique are common among patients with asthma, with over half of patients in this study making ≥1 serious errors. \(^{(13, 14)}\) Before inhalation, do not rinse mouth with water after inhalation and Failure to hold breath after inhalation

Which is in agreement with Westerik JA et al,\(^{(12)}\) when the two errors most frequently reported in our study (failure to exhale before inhalation and insufficient [or absent] breath-hold at the end of inhalation) are in agreement with previously published reports of the most frequently observed errors with the Diskus being “no exhalation before inhalation” and “no breath holding after inhalation”. But the third most common error in former study (inhalation that was not forceful from the start), which in agreement with that also been reported by other previous studies\(^{(15-17)}\).
children older than 5 years). uptodate; 2015.


Ecological Studies of Certain Aphid Species and their Associated Predators on Wheat Plants at Qadisiyah Distract, Iraq

Ahmed Shamkhi Jabbar¹, Saadoon Murad Sasdoon²

¹Plant Protection Department, Agriculture College, University of Qadisiyah, Iraq.
²Plant Protection Department, Agriculture College, Al-Muthanna University, Iraq.

ABSTRACT

Background: Studies were carried out at Qadisiyah district, Iraq to study certain aphid species infestation and their associated predators on wheat plants during season 2016-2017. Methods: Survey and population density of piercing sucking pests and their predators on wheat plants were investigated. Results: The dominant aphids were wheat, Schizaphis graminum (Rondani), Sitobion avenae (Fabricius), Rhopalosiphum maidis (Fitch), Rhopalosiphum padi (Linnaeus) and Diuraphis noxia (Mordvilko). Whereas, the prevailing associated predators were Coccinella undecimpunctata (L.), Coccinella septempunctata (L.), Chrysoperla carnea (Steph.) Metasyrphus corollae F., and a few number of true spiders. Obtained results showed that The infestation with S. graminum was much higher wheat plantations than other aphids in 2016-2017 season. Schizaphis graminum had three peaks of activity were recorded on the last week of January, March and April (455.1,3250.7 and 907.6 individuals/100 tillers, resp.) in 2016-2017 season. Meanwhile, S. avenae had two peaks of activity were recorded on the last week of March and April (2010.9 and 570.2 individuals/100 tillers, resp.). Also, C. septempunctata had two peaks of activity were recorded on the last week of March and Second week of May (35.7 and 25.0 individuals/100 tillers, resp.) on the same period of study.

Keywords: Cereal aphid, Predators, wheat.

INTRODUCTION

Aphid are one of the insect groups whose economic importance increases with the development of agriculture. Cereal aphid are the serious pests attacking cereal crops, particularly wheat, barley and corn not only in Iraq but also in many other countries; i.e. Egypt, Souther Russia, Iran, Afghanistan, and countries bordering the Mediterranean Sea. The species that are capable of causing substantial yield reductions are Schizaphis graminum (Rondan), bird cherry oat aphid, Rhopalosiphum Padi L., R. maidis. F., Sitibion avenae F. and Diuraphis noxia. The use of insecticides in controlling aphids generally, leads to many problems, not only increasing resistant strains of aphids to these chemical substances, but also in induction of pollution to man and beneficial insects such as bees and other pollinators, insect parasitoids and predators. Numerous publications documented the suppression of cereal aphid population by natural enemies. Therefore, this investigation aims to study the role of aphids phagous insects in reducing aphid population on wheat crop in Qadisiyah district, Iraq. Study the effect temperature and relative humidity on the population density of wheat aphid and associated predators on field.

MATERIALS AND METHOD

The present investigation was carried out at fields of Qadisiyah district, Iraq during 2016-2017 season.

Survey and Population Density of Piercing Sucking Pests and Their Predators on wheat Plants: Surveying of major piercing sucking pests and their predators took place during successive growing season 2016-2017 on wheat plant. The cultivated area was one donum(2500sq.m), the sowing date was in the 1st November in 2016-2017 season. Sapling started after about three weeks from planting and continued to the harvesting time. The sample size was 100 wheat tillers and chose randomly from plants. Direct count of adults...
of injurious insects and predators on wheat plant was undertaken. Since the predators under investigation differed in their living habits, activities, and distributions on the host plants infested with different prey and host insects the it was necessary to use one sampling method for all groups such as leaves sampling plant method in order to explain the relationship between pests and their associated predators. Sample of 100 tillers of wheat plants were biweekly in some few cases, picked up randomly and placed in paper bags to be examined carefully under microscope. The number of insect pests and predators (immature stages and adults) in most cases were directly counted. The collected specimens were kept in vials containing 75% ethyl alcohol with some drops of glycerin to keep their tissues soft, and labeled for date. Identification according to key of Aphididae, described by (Helmi, 2011) and department of classification in plant protection Research Institute, Agriculture Research Center, Egypt.

Study the Effect of Certain weather factors of the Sucking Pests (Aphid species) and Their Predator on Wheat: Daily recorded of minimum temperature, maximum temperature and relative humidity were obtained from Agrometeorological station at AL Qadisiyah region during the period of study. The relationship between the biweekly mean number of aphids and predators individuals and the corresponding biweekly means of the previously mentioned weather factors were statistically analyzed. The simple correlation coefficient between weather parameters and the number of pests and their associated predators were studied according to\textsuperscript{11,12}.

RESULTS AND DISCUSSION

Survey of certain aphid species and their associated predators in wheat plant: The seasonal abundance of the dominant aphid species infesting wheat plants were Green cereal- bug aphid \textit{Schizaphis graminum} (Rondani), English grain aphid \textit{Sitobion avenae} (Fabricius), Coron leaf aphid \textit{Rhopalosiphum maidis}(Fitch), Bird cherry oat aphid \textit{Rhopalosiphum padi} (Linnaeus) and Russian wheat aphid \textit{Diuraphis noxia} (Mordvilko). As seen from Table 1. the percentage in fertation of \textit{R. padi}, \textit{R. maidis}, \textit{S. avenae}, \textit{S. graminum} ,and \textit{D. noxia} were 14.77%, 12.48%, 26.91%, 41.63 and 4.21%, respectively during season 2016-2017. Similar result were obtained by Alhag et al., 1996 and Abd el – Aziz 2014, who mentioned that \textit{C. undecimpunctata}, \textit{C. carnea} and \textit{M. corollae} on cereal aphid in wheat plant.

Table 1. Number of aphid insect species and their percentages to total catch related to their orders at wheat plants at Qadisiyah district in the growing season 2016 - 2017.

<table>
<thead>
<tr>
<th>Aphid species</th>
<th>2016-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Homoptera</td>
<td>Total individuals</td>
</tr>
<tr>
<td>\textit{R. padi}</td>
<td>4252.95</td>
</tr>
<tr>
<td>\textit{R. maidis}</td>
<td>3592.2</td>
</tr>
<tr>
<td>\textit{S. avenae}</td>
<td>7746.6</td>
</tr>
<tr>
<td>\textit{S. graminum}</td>
<td>11985.76</td>
</tr>
<tr>
<td>\textit{D. noxia}</td>
<td>1211.6</td>
</tr>
<tr>
<td>total</td>
<td>28789.11</td>
</tr>
</tbody>
</table>

Population density of certain aphid species infested wheat plants during the period of study: Five species of aphids were recorded during 2016-2017 season these aphid species were \textit{S. graminum}, \textit{S. avenae}
R. padi, R. maidis, and D. noxia.

A.1. *Schizaphis graminum*: Data in (figer1) showed initial number of *S. graminum* occurred in last week of November with a total number of 15.6 nymph/100 tiller. Three peaks of activity were recorded at last week of January, March and April (455.1, 3250.7 and 907.6 individuals).

A.2. *Sitobion avenae*: *S. avenae* began to appear on wheat in 4th week of November. Two peaks of activity were recorded at 4th week of March and April (2010.9 and 570.2 individuals). (Fig 1)

A.3. *Rhopalosiphum maidis* and *R. padi*: Data fig 1 showed initial number of *R. maidis* and *R. padi* occurred in 4th week of November with a total number of (3.7 and 5.3 individuals). One peaks of activity was recorded at last week of February (960.6 and 1050.7 individuals) for *R. maidis* and *R. padi* respectively.

A.4. *Diuraphis noxia*: Numbers of *D. noxia* associated with wheat plant during 2016-2017 season are tabulated in (Fig 1) initial number were stated on last week of December (10.2 individuals / 100 tillers) and gradually increased to reach the maximum (310.2 individuals / 100 tillers). On the other hand Darwish and Ali., 1991 found the aphids *S. graminum* and *R. maidis* reached their maximum abundance (406 and 518 / plant) in upper Egypt. These results in agreement with those of Slman., 2006 and Sabbour., 2007 in Egypt, they found that the wheat plants were infested by four cereal aphid, *R. padi*, *R. maidis*, *S. graminum*, and *S. avenae*. They reported also that, the population of aphid peaked on fourth week of March and coincided with the highest number of *C. undecimpunctata*. Tabasum et al., 2012 observed a maximum aphid population on wheat during February 24 and then a decline observed up to march 8. again on march 8 up to march 17.

Fig. 1. Seasonal abundances of certain aphid species on wheat plants in 2016/2017 season at Qadisiyah district.
Seasonal Abundance of Predators Associated with Certain Aphid Species infesting wheat at Qadisiyah District: Catches of predatory species revealed the following species *Coccinella undecimpunctata*, *Coccinella septempunctata*, *Chrysoperla carnea* and *Metasyrphus corollae* and few number of true spiders.

B.1. *C. septempunctata*: The *C. septempunctata* began to appear on wheat plants at low density during second week of December (1.2 individuals). Two peaks of activity were attained on 4th of March and 2nd of May (35.7 and 25.0 individuals).

B.2. *C. undecimpunctata*: The number of *C. undecimpunctata*, took place in the 2nd week of December (1.5 individuals). Its increased to reach their maximum in 4th week of March (31.5 individuals).

B.3. *C. carnea*: The *C. carnea*, began to appear on wheat plants at low density during 2nd of December (1.3 individuals). It’s increased to reach their maximum in 4th week of March (20.2 individuals).

B.4. *M. corollae*: Initial number of *M. corollae*, were stated on last week of December (1.5 individuals / 100 tillers) and gradually increased to reach their maximum (15.3 individuals). However, El- Heneidy and Rizk, 2004, Slman and Ahmed, 2005 and Yigit et al, 2007, recorded that *C. undecimpunctata*, and *C. carnea* the most specific aphid predator of cereal aphid in wheat fields. Also, Samad, 2004 and El- Heneidy and Rizk, 2004, recoded that *Metasyrphus corollae* in the third predators position after *C. undecimpunctata*, and *C. carnea*.

**Fig. 2. Seasonal abundances of certain predators species on wheat plants in season 2016/2017 at Qadisiyah district.**

**Effect of weather factors on the population density of certain aphid species and their predators on wheat plants**

1- aphid

On *R. padi*: The obtain results indicated that the (minimum, maximum and mean) temperatures cleared a negative significant correlation with population of *R. padi* on wheat during 2016-2017 (-0.5088, -0.4574 and -0.4833). Meanwhile the mean relative humidity showed a negative slight correlation in the same season.

**On *R. maidis***: The (minimum and mean) temperature cleared a negative significant correlation with population of *R. maidis* (-0.4870 and -0.4611) on wheat. However, max., temperature showed slight negative correlation (-0.4349) and the relative humidity showed a slight positive correlation with population *R. maidis* on wheat during season 2016-2017 (table 3).

**On *S. avenae* and *D. noxia***: The temperature (minimum, maximum and mean) and relative humidity cleared a slight a negative correlation with population of *S. avenae* (-0.1646, -0.1458, -0. 1552 and -0.1402)
while, were (-0.335, -0.3036, -0. 3198 and -0.0016) during 2016-2017 season (table 3).

On *S. graminum*: The temperature (minimum, maximum and mean) showed a slight positive correlation with population of *S. graminum* while, the relative humidity cleared a slight negative correlation during season 2016-2017 (table 3). These agree with Abd El-Aziz, A.A. A. 2014 who reported that the temperature had a great effect on biology of *S. graminum*. Powell 1986 in United Kingdom mentioned that the low abundance of cereal aphid population infesting wheat may due to the combined action of natural enemies as well as the variability of climatic conditions from year to another.

Table (3)Simple correlation between certain aphid species and climatic factors on wheat during 2016-2017 season at Qadisiyah district .

<table>
<thead>
<tr>
<th>Variable</th>
<th>Insect Pests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R. padi</td>
</tr>
<tr>
<td>Min.Temp.</td>
<td>-0.5088*</td>
</tr>
<tr>
<td>Max. Temp.</td>
<td>-0.4574*</td>
</tr>
<tr>
<td>Mean Temp.</td>
<td>-0.4833*</td>
</tr>
<tr>
<td>R.H</td>
<td>-0.0535</td>
</tr>
</tbody>
</table>

**CONCLUSION**

Obtained results showed that the infestation with *S. graminum* was much higher wheat plantations than other aphids in 2016-2017 season. *C. undecimpunctata*, and *C. carnea* the most specific aphid predator of cereal aphid in wheat fields. Statistical analysis showed that temperature and relative humidity were significant with some insects and insignificant with the others.

**Conflict of Interest**: None

**Funding**: Self

**Ethical Clearance**: Not required.

**REFERENCE**


4. USAID. Improving grain production in Iraq. The Agriculture Reconstruction and Development Program for Iraq; 2006.


Influence Bacterial Inoculant of Local Isolates of Azotobacter Vinelandii and Irrigation Water Quality on Growth and Yield of Wheat (Triticum aestivum L.)

Ghanem Bahlool Nooni 1, Abdualla Kreem Jbar 1, Sofia Jabbar Jasim Al-Rikabi 1

1 Agriculture College, Al-Muthanna University, Iraq

ABSTRACT

The present study deals with the isolation and characterization of Azotobacter vinelandii and A pots experiment was conducted at the canopy wood of Agriculture - University of Al-Muthanna (station 2) during winter season of 2016-2017 to study the effect of inoculant bacterial and irrigation water quality and their interactions on yield and growth of wheat. Treatments included four levels of inoculant bacterial (without inoculation A 0 and inoculation with three locally Azotobacter vinelandii coded A 1, A 2, A 3 and three water qualities river water (0.752 ds.m -1 W 0), mixed water (3.6 ds.m -1 W 1) and drainage water (6.5 ds.m -1 W 2). The results showed, generally bacterial inoculant treatments was superior to the un-inoculant treatment A 0 in most character studied and A 2 treatment achieved best result compared with other isolation locally, in height plant, dry weight plant, weight of 1000 seeds, yield and nitrogen uptake) was recorded (99.10 cm, 15.50 g plant -1, 29.29 g, 32.95 g plant -1, 73.56 mg plant -1) sequentially. Generally increasing salinity in irrigation water significantly decreased growth characters, yield, and yield components of plant. Interaction between biofertilizer treatments and salinity had a significant effect on plant growth and yield and yield components of plant and the best result were had been gave by A 2 W 0 in all traits studied (height plant, dry weight plant, weight of 1000 seeds, yield and nitrogen uptake) which was recorded (106.88cm, 17.97g plant -1, 30.34g, 39.34g plant -1, 97.43mg plant -1) respectively.

Key words: Azotobacter vinelandii, water salinity, inoculant.

INTRODUCTION

Bio-fertilizers are cheap sources for plants nutrient and alternative mineral fertilizers using. They also reduce soil and water pollution as well as Bio-fertilizers different benefits forms by reducing the of chemical fertilizers quantities 1. Agricultural development Sustainable is requires optimal use of microorganisms effectiveness and their biological activity in agricultural soils, which is an environmentally safe alternative to the availability of plant nutrients compared to chemical fertilizers 2. Azotobacter most important for plant growth due to their role of nitrogen supply for plants and it is have been high efficiency of nitrogen fixation and hormones growth production 3. Many studies refereed that Iraq’s soils have been an overabundance of bacteria but there is many factors are inhibit growth and its existence such as drought and salinity of soil 4. Water Quality of irrigation are one of most important of basic natural resources for many centuraries of the world particularly that located in semi-dry and dry area which use water irrigation in agricultural production so that are limit factor to development of agriculture in many countries. quality of water irrigation consider when using of water have a salt, the water irrigation quality can be using to expended area which use for agriculture production by mixing it with fresh water and use bacterial inoculants, to reduce harmful of water salt. The study aim is to investigate three isolates, which use inoculants of local bacteria and three levels of water irrigation salinity to determine best level can be suitable for inoculant bacterial and plant growth of wheat plant.

DOI Number: 10.5958/0976-5506.2019.00318.8
MATERIALS AND METHOD

Isolation and bacteria diagnosis

Three soil rhizosphere samples were collected from geographical local of Al Muthanna province shown in table 1.. Sucrose mineral-salts broth media was used to soil inoculation by Azotobacter vinelandii isolates. Soil dilution prepared Take 1 ml to test tubes inoculation by above medium, which was making and sterilized by autoclave for 20 min at 121 °C and 15 lb.by. Tubes incubated at 30 ° C for 7 days and were testing a thin white membrane observation on the surface, which is an indicator of Azotobacter spp. Growth taking 0.1 ml of the tubes, which gave a growth indication and spread on a Petri dish surface containing the medium Sucrose mineral-salts agar. Dishes Incubate at 28 ° C for 2-3 days were re streak to obtain pure colonies of bacteria, White colonies were then extracted, a brownish dye was given to the medium.

Table 1. Numbers of soil samples and names of areas and fields collected from them.

<table>
<thead>
<tr>
<th>Sample number</th>
<th>Geographical</th>
<th>Plant in soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rumaitha district</td>
<td>Wheat</td>
</tr>
<tr>
<td>2</td>
<td>Warka district</td>
<td>Alfalfa</td>
</tr>
<tr>
<td>3</td>
<td>Samawah district</td>
<td>Barley</td>
</tr>
</tbody>
</table>

Field experience A field experiment was designed to study the effect three A. vinelandii isolates and three levels of water irrigation quality. CRD was designed using two factors, as shown below:-

The first factor:-
Bacterial inoculants by four levels symbols taken :

A0 = without inoculant, A1 = local isolate of Rumaitha district -Muthanna province, A2 = local isolate of Warka district -Muthanna province and A3 = local isolate of Samawah district -Muthanna province

The second factor:-
Water irrigation quality by three levels the symbols taken :

W0 = 0.750 ds. m⁻¹ (river water), W1 = 3.6 ds.m⁻¹ (mixed water) and W2= 6.5 ds.m⁻¹ (well water).

Experiment was carried out by three replicates: Experimental units number = 4 × 3 × 3 = 36 units.

Soil preparation

The experiment was conducted in lath-house at the College of Agric., University of AL-Muthanna season 2016-2017. The wheat seeds were cultivated Aba 99 variety in 15/11/2017. Nitrogen fertilizer was added in the form of urea (46% N) at 20 kg N ha⁻¹, a stimulant for the action of the bacteria. The phosphate fertilizer was added as a superphosphate fertilizer (48% P₂O₅) by 60 kg. ha⁻¹ potassium was added by 120 kg ha⁻¹ in the form of potassium sulfate K₂SO₄ (43% K), when the wheat arrived to maturity at the end of the winter season of 2017. the wheat crop was harvested by cutting the plants from the area near the surface of the soil, also recorded the following measurements:Plant height, plant dry weight, grain yield and nitrogen uptake of plant.

Table 2. The following table shows chemical, physical and biological characteristics.

<table>
<thead>
<tr>
<th>pH 1:1</th>
<th>Ece ds.m⁻¹</th>
<th>OM%</th>
<th>Available% N</th>
<th>Available% P</th>
<th>Available% K</th>
<th>Sand gm kg⁻¹</th>
<th>Silt gm kg⁻¹</th>
<th>Clay gm kg⁻¹</th>
<th>Total bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.75</td>
<td>4.25</td>
<td>0.65</td>
<td>24.3</td>
<td>12.5</td>
<td>275</td>
<td>232</td>
<td>388</td>
<td>379</td>
<td>2.8x10⁷</td>
</tr>
</tbody>
</table>

Silty clay

RESULTS AND DISCUSSION

The colonies of the isolated were smooth, convex, glistening and opaque on media. The isolate was Gram-negative, motile rods, positive for catalase and oxidase test. The biochemical characterization (QTS-24 miniaturized identification tests) based on carbon/ nitrogen source utilization pattern revealed that the isolate can utilize more carbon sources than that of nitrogen and indicated highest (98%) similarity to the genus Azotobacter when compared with Bergey’s Manual of Determinative Bacteriology³. The isolate was positive
for tryptophan deaminase, sodium citrate, sodium melonate, ornithine decarboxylase, H2S production, urea hydrolysis, indole acid from glucose, acid from maltose, acid from sucrose, acid from rhamnose, acid from sorbitol and acid from raffinose. The comparison of this biochemistry characteristic depicted 98% similarity A. vinelandii. Height Plant cm. The results showed in table (3) the inoculant bacterial effected in the height plant. A treatment A2 was best which recorded a mean 99.10cm with an increase reached 28.83% compared control relative, we can explain to inoculation with Azotobacter vinelandii is an ideal tool to supply the soil with a high density of beneficial microorganisms. An increase of the height plant average may be due to the inoculant’s characteristics. A researchers Abd El-Gawad et al, 2009 and Zaied, 2009 referred that the secretions of bacteria conduce an important role in the elongation of plant cells, and increased division of plant cells, as well as their activity in the nitrogen fixation, which provided some of the nitrogen in Different stages of growth. The impacts positive are may be due to the effect of environmental factors in the isolates of bacteria isolated from salt environmental zones whereas it is did not adaptation to the new environment.

**Table 3. Effect of inoculant bacterial and different level of water quality in plant height (cm)**

<table>
<thead>
<tr>
<th>Mean A</th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
</tr>
</thead>
<tbody>
<tr>
<td>76.58</td>
<td>79.66</td>
<td>77.22</td>
<td>72.88</td>
</tr>
<tr>
<td>87.55</td>
<td>89.22</td>
<td>89.88</td>
<td>83.55</td>
</tr>
<tr>
<td>99.10</td>
<td>106.88</td>
<td>102.55</td>
<td>87.88</td>
</tr>
<tr>
<td>89.33</td>
<td>94.22</td>
<td>89.55</td>
<td>84.22</td>
</tr>
<tr>
<td>83.13</td>
<td>91.74</td>
<td>89.80</td>
<td>Mean W</td>
</tr>
<tr>
<td>A*W</td>
<td>W</td>
<td>A</td>
<td>L.S.D</td>
</tr>
<tr>
<td>6.08</td>
<td>2.31</td>
<td>4.51</td>
<td></td>
</tr>
</tbody>
</table>

A data of analysis statics revealed a water quality factor influenced on plant height so W0 treatment was superior which recorded 91.74 cm compared with other treatment W1 and W2 which that reached 89.80, 83.13 cm respectively. A decreases of height plant due to water quality are bad because salinity of water particular inW0 and W2 treatment. The positive response of yield as a result of inoculation may be due to the high ability of these microbes in N2-fixation and the secretion of several compounds that increase soil fertility and decomposition of organic materials that increase the plant’s ability to grow and increase productivity.

**Dry weight**

The results showed in table (4) the inoculant bacterial effect in the dry weight of vegetable plant. for Azotobacter vinelandii locally isolated treatment A2 was superior recorded a mean increase of 15.50 gm plant⁻¹ with an increase of 29.81% compared control relative. An increase explain to inoculation bacterial with Azotobacter vinelandii which is have many characteristics such is provide macro elements as N,P,K and micro elements and secretion some hormones which is promoting plant growth. The results agreed with many researchers.

**Table 4. Effect of inoculant bacterial and different level of water quality in dry weight of the plant (g plant⁻¹).**

<table>
<thead>
<tr>
<th></th>
<th>W2</th>
<th>W1</th>
<th>W0</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0</td>
<td>14.75</td>
<td>11.58</td>
<td>11.94</td>
</tr>
<tr>
<td>A1</td>
<td>16.19</td>
<td>14.69</td>
<td>14.44</td>
</tr>
<tr>
<td>A2</td>
<td>17.97</td>
<td>15.11</td>
<td>15.50</td>
</tr>
<tr>
<td>A3</td>
<td>16.87</td>
<td>14.41</td>
<td>14.74</td>
</tr>
<tr>
<td>Mean A</td>
<td>16.45</td>
<td>13.95</td>
<td>12.08</td>
</tr>
<tr>
<td>A*W</td>
<td>W</td>
<td>A</td>
<td>L.S.D</td>
</tr>
<tr>
<td>0.53</td>
<td>0.33</td>
<td>0.38</td>
<td></td>
</tr>
</tbody>
</table>

The results in table 4 referred that using water irrigation quality are possibility influence on dry weight of plant. The river water (W0) was used recorded high values reached 16.45 gm plant⁻¹ than compared with W1,W2 treatments which gave (13.95, 12.08) gm plant⁻¹ respectively. The interaction dual of bio-fertilizer and water irrigation quality in the dry weight of the plant A2W0 was recorded 17.97 g plant⁻¹. A percentage increase was 33.33% maybe that cause of Water irrigation quality effect and inoculant which has the ability to release nitrogen-fixing bacteria through growing season and It has already been shown that the use of nitrogen fixing bacteria with high effective ability in solubilizing organic and inorganic phosphates (Rahim et al, 2016).

**Grain yield (g plant⁻¹)**

The results of the statistical analysis shown in table
5, which refer effect of inoculant bacterial type and water quality in the grain yield. The locally bacteria A2 were superior to the other treatments regardless the water quality type it recorded 32.95 g plant\(^{-1}\). This is refer to bacteria ability to produce a growth stimulated such as Indol Acetic Acid. This is confirmed by Samurai et al., (2006) as well as it Sidrophores secretions, which is a sticking to micro elements such as iron and zinc and availability increase its as well as its enzymatic activity and nitrogen fixation\(^7\). This can supply sufficient N\(_2\) and assist the hydrolysis of a wide range of P compounds leading to increased crop production\(^11\). These results confirmed by the works were carried out by\(^{12,13,14}\).

Table 5. Effect of inoculant bacterial and different level of water quality in grain yield (g plant\(^{-1}\)).

<table>
<thead>
<tr>
<th></th>
<th>W2</th>
<th>W1</th>
<th>W0</th>
<th>A0</th>
<th>A1</th>
<th>A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.93</td>
<td>23.59</td>
<td>26.80</td>
<td>30.39</td>
<td>A0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.57</td>
<td>24.52</td>
<td>28.26</td>
<td>35.92</td>
<td>A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32.95</td>
<td>28.99</td>
<td>30.53</td>
<td>39.34</td>
<td>A2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.64</td>
<td>24.68</td>
<td>27.59</td>
<td>33.66</td>
<td>A3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Effect of inoculant bacterial and different level of water quality in nitrogen uptake (mg plant\(^{-1}\)).

<table>
<thead>
<tr>
<th></th>
<th>W2</th>
<th>W1</th>
<th>W0</th>
<th>A0</th>
<th>A1</th>
<th>A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>55.31</td>
<td>39.37</td>
<td>53.46</td>
<td>73.11</td>
<td>A0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>63.88</td>
<td>50.40</td>
<td>59.20</td>
<td>82.04</td>
<td>A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>73.56</td>
<td>56.96</td>
<td>66.28</td>
<td>97.43</td>
<td>A2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>68.33</td>
<td>53.65</td>
<td>61.48</td>
<td>89.87</td>
<td>A3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results showed increasing salinity irrigation water caused decreasing nitrogen uptake, compared with River water. W0 treatment had gave the highest values of nitrogen uptake in vegetable plant, it’s had been reached 85.61 mg plant\(^{-1}\). The gradual depression occurred in all the growth characters of plant due to the irrigation with saline water. Thus, as salinity is a condition of excess salts in soil solution, it affects plant by increasing the osmotic pressure of the soil solution. These results are in agreement with those obtained by Ebrahim et al. (2010). They found that increasing salinity in irrigation water decreased growth characters of plant. The interaction between Biofertilizer and irrigation water salinity had a significant effect on nitrogen uptake of wheat plants. The highest value of nitrogen uptake by plants were recorded 97.43 mg plant\(^{-1}\) when inoculated with \textit{Azotobacter} and, irrigated by river water (A2W0).

**Ethical Clearance:** Taken from ethical committee of institution.

**Conflicts of Interest:** Nil.

**Funding:** Self

**REFERENCE**

1. Al-Sefat L. Biological fertilization and its role in reducing the problems of water pollution with chemical fertilizers. Faculty of Natural Resources


Effect of Zinc Methionine on Some of the Productive Traits of Broilers

Abbas S.H. Al Machi¹, Jassim K. Al-Gharawi¹, Mousa A. Hassan¹ Radhi A. Al-Ziadi²

¹Animal Production Department, Agriculture College, Al-Muthanna University, Iraq,
²Directorate of Muthanna Agriculture, Ministry of Agriculture, Iraq

ABSTRACT

The trial was designed to evaluate the addition of zinc methionine to the diet on some productive and carcasses performance of broiler, the study was conducted in the poultry field, Animal Production Department, Agriculture Faculty, Al-Muthanna University, from 1/4/2018 to 15/5/2018. A total of 400 broiler, one day, unsexed Ross308 strain were randomly distributed to four treatments (100 chick / treatment), each treatment included four replicates (25 chick per replicate), The chickens were reared in four-floor batteries with a measuring 2 x 1.5 meters per floor. The treatments of the experiment were as follows: First treatment (T1): a control treatment, zinc methionine was added at levels 400, 500 and 600 g per ton of feed for T2, T3 and T4 treatments respectively. The results showed that the T4 resulted in a significant improvement (p≤0.05) in body weight, body gain, feed consumption, feed conversion and mortality compare with other treatments. Keywords: zinc methionine, broilers, productive.

INTRODUCTION

Rare metals are important in feeding poultry, as it affects the speed of growth and metabolic rate, which is reflected in their production performance such as eggs or meat, because it has an important role in vital processes¹. As well as necessary for the permanence of life, it is an enzyme-stimulating agent involved in the construction of its systems². Zinc is a rare mineral and contributes to the synthesis of more than 300 enzymes³, formation of blood cells red increased thyroid hormone secretion⁴. Many researchers point to the benefits of zinc as it has the role of manufacturing RNA and DNA, restoring tissue growth and contributing to bone mineral deposition, increases the production of eggs, increases the shell thickness and improves the conversion coefficient of broilers⁵,⁶,⁷. The lack of zinc in the diet will affect the growth rate as well as the irregularity of bone formation, decrease in feathering and the decrease of the body’s immunity against many diseases⁸. There are many studies on the use of zinc in poultry diets that its addition affects the productive qualities, the addition of high-grade zinc to the diet was given the highest increase in weight gain⁹, the same results followed with addition of zinc as well as improved food conversion coefficient¹⁰. The addition of zinc to broiler broilers led to increased feed consumption and improved food conversion coefficient, and a significant decrease in the mortality, this improvement in body weight, weight gain and feed conversion was positively reflected on the measure of the production index⁶,¹¹, this was found by Abbas (2018), observed a significant improvement in body weight, weight gain, feed conversion, production index, significant decrease in mortality and significant improvement of thigh, wing and neck when adding organic zinc to 80 mg / kg feed¹². Conducted a study on the addition of zinc at levels of 120,90,60,30,0 mg / kg stock feed in improving growth rate as well as good consumption of daily feed. Ezzat et al. (2013) noted that the addition of zinc at different levels of chicken broilers contributed to a higher than normal high body weight. Kwiecień et al. (2016) fed meat broilers on zinc-containing diets that led to a positive increase in chest and femoral weight. Jahanian et al. (2008) reported that the addition of zinc Methionine (Zn Met) to the diets improved the proportion of reflux and the proportion of breast meat and increased liver weight. Al-Daraji et al. (2012) noted that the intake of zinc in

Corresponding author:
Abbas S.H. Al Machi
Email : Abbasalmachi@gmail.com
large quantities more than the need of the body will prevent the absorption of copper from the bowel, leading to the emergence of anemia. Zinc is poorly absorbed by the intestines so we increase its concentration more than the required requirement of 40 mg / kg feed, as indicated by NRC (1994) to absorb what is needed by the bird and the rest is thrown out of the body and this leads to obstruction absorption of copper from the intestine. The idea of adding zinc methionine (Zn Met) to the diet to know its effect on some of the productive and carcasses qualities of broilers.

**MATERIALS AND METHOD**

A total of 400 chicks one day, Ross Broiler, were randomized distributed to four treatments (100 chick/ treatment). Each treatment consisted of four replicates (25 chick per replicate), experiment treatments were as follows: The first treatment (T1): a control treatment in which the birds fed on a diet without addition. The second treatment (T2): In which the birds were fed on a diet, 400 g / t of zinc methionine was added. The third treatment (T3): in which the birds were fed on a diet, 500 g / t of zinc methionine was added. The fourth treatment (T4): In which the birds were fed on a diet, 600 g / t of zinc methionine was added. The chicks were fed by starter for 1-21 days and Grower for 22-35 days. The ratios were calculated according to table 1. The water and diet were provided ad libitum. Studied traits were weekly body weight, weight gain, feed consumption, feed conversion, mortality and production index.17

<table>
<thead>
<tr>
<th>Table 1. Basal diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Corn</td>
</tr>
<tr>
<td>Soya bean meal1</td>
</tr>
<tr>
<td>Primex2</td>
</tr>
<tr>
<td>Limestone</td>
</tr>
<tr>
<td>Dicalcium phosphate</td>
</tr>
<tr>
<td>Oil</td>
</tr>
<tr>
<td>Anti-toxin</td>
</tr>
<tr>
<td>Antifungal</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Calculated chemical composition

| Total protein (%)  | 22                 | 20                   |
| Metabolism energy (kilocalorie/ kg) | 2950           | 3100             |
| Methionine (%)     | 0.51               | 0.48                 |
| Methionine + cystine (%) | 0.90          | 0.80               |
| Lysine (%)         | 1.15               | 1.00                 |
| Calcium (%)        | 1.00               | 0.90                 |
| Available phosphorus (%) | 0.43          | 0.40               |
| Fiber (%)          | 3.00               | 3.50                 |
| Fats (%)           | 2.80               | 3.00                 |

1. The soybeans used by an Argentine source contained 48% crude protein and energy representing 2,400 kcal / kg.

2. Premix Max Care contains 16% protein, 900 kilocalorie energy, 10% lysine, 9.5% methionine and 9.5% sodium, 2% fat, 1% fiber, 12% calcium, phosphoric 13% Sodium, 5%. Calcium phosphate was (21.8% calcium and 18% phosphorus).

3. Chemical composition of the components of diet was calculated according to NRC (1994).

Statistical analysis

The data were analyzed in a one-way analysis using the statistical program20, The averages were compared using the Duncan Multiple Test21.
RESULTS AND DISCUSSIONS

BODY WEIGHT

Significant increase (P≤0.05) for the treatment (T4) in the body weight at the 5 weeks age, the body was 1995 g for T4 and 1968, 2939 and 1873 g, the other treatments T3, T2 and T1 respectively, These results were consistent with Kucuk et al. (2003): Ezzati et al. (2013): Abbas (2018) who observed a significant superiority of the final body weight when adding organic zinc to broilers, this improvement in body weight may be due to the zinc as an enzyme, important for metabolism, thus improved body weight2. The modern broiler breeds were characterized by rapid growth and therefore need zinc to become larger. This increases the body weight by increasing the level of zinc in the diets, but does not reach the excessive limit that allows it to bind with copper and impede its absorption and the incidence of anemia.

Table 2. Effect of Addition of Different Levels of Zinc Methionine (Zn Met) on body weight (g) of broiler (± S.E.).

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Age (week)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>111.66±0.49</td>
<td></td>
</tr>
<tr>
<td></td>
<td>298.46±0.94</td>
<td>577.09±5.06</td>
</tr>
<tr>
<td>T2</td>
<td>110.82±0.82</td>
<td></td>
</tr>
<tr>
<td></td>
<td>301.16±1.05</td>
<td>589.35±4.32</td>
</tr>
<tr>
<td>T3</td>
<td>112.18±0.77</td>
<td></td>
</tr>
<tr>
<td></td>
<td>304.62±2.01</td>
<td>600.11±4.19</td>
</tr>
<tr>
<td>T4</td>
<td>111.42±0.29</td>
<td></td>
</tr>
<tr>
<td></td>
<td>308.02±1.14</td>
<td>611.60±5.04</td>
</tr>
<tr>
<td>Sig.</td>
<td>N.S</td>
<td></td>
</tr>
</tbody>
</table>

T1: A control treatment in which birds are fed on a diet without additives. T2: fed the birds on a diet supplemented with 400 g / t of zinc methionine. T3: fed the birds on a diet supplemented with 500 g / t of zinc methionine. T4: fed birds on a diet supplemented with 600 g / t of zinc methionine. (Mean ±S.E) means ± standard error. (N.S) No significant differences between mean values. * There were significant differences between the mean values at the probability level (P≤0.05).

Body gain

Table 3. shows a significant increased (P≤0.05) in for the cumulative body gain weight. The fourth treatment (T4) recorded the highest value of this trait at 1955 g on the rest of the experiment, which recorded the lowest values significantly and reached 1833 g. These results were consistent with the findings of Innoconti et al. (2004): Ao et al., (2006): Abbas, (2018), which showed that the addition of zinc to the broiler chicks resulted in a significant improvement in body gain.

Table 3. Effect of Addition of Different Levels of Zinc Methionine (Zn Met) on body gain (g) of broiler (± S.E.).

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Age (week)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>71.66±0.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>186.80±0.97</td>
<td>278.63±1.74</td>
</tr>
<tr>
<td>T2</td>
<td>70.82±0.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>190.18±1.06</td>
<td>288.18±1.55</td>
</tr>
<tr>
<td>T3</td>
<td>72.18±0.09</td>
<td></td>
</tr>
<tr>
<td></td>
<td>192.49±0.52</td>
<td>295.49±0.94</td>
</tr>
<tr>
<td>T4</td>
<td>71.42±0.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>196.60±0.79</td>
<td>303.58±1.47</td>
</tr>
<tr>
<td>Sig.</td>
<td>N.S</td>
<td></td>
</tr>
</tbody>
</table>

T1: A control treatment in which birds are fed on a diet without additives. T2: fed the birds on a diet supplemented with 400 g / t of zinc methionine. T3: fed the birds on a diet supplemented with 500 g / t of zinc methionine. T4: fed birds on a diet supplemented with 600 g / t of zinc methionine. (Mean ±S.E) means ± standard error. (N.S) No significant differences between mean values. * There were significant differences between the mean values at the probability level (P≤0.05).
**Feed Consumption**

Table 4. shows that there is a significant superiority (P≤0.05) for birds of the fourth treatment (T4) for the consumption of the cumulative feed, recorded a value of 3400 g / bird at the age of 5 week for the other of the experimental birds, which recorded values less 3381, 3358 and 3308 g / bird for treatments T1, T2 and T3 respectively. The reason may be that nutrition at high levels of zinc leads to an increase in microscopic microbes that enter the zinc in their diet, which have a major role in the digestion of fiber, especially the secum, which works to increase the speed of food passage in the intestines, Which increases the need for birds to consume large amounts of feed.

**Table 4. Effect of Addition of Different Levels of Zinc Methionine (Zn Met) on feed consumption (g) of broiler (± S.E.)**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Age (week)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>T1</td>
<td>113.93±0.64</td>
<td>308.22 b±0.92</td>
</tr>
<tr>
<td>T2</td>
<td>113.31±0.34</td>
<td>311.90 ab±0.70</td>
</tr>
<tr>
<td>T3</td>
<td>115.49±0.21</td>
<td>313.76 ab±0.57</td>
</tr>
<tr>
<td>T4</td>
<td>113.56 ±0.29</td>
<td>318.49 a±0.32</td>
</tr>
<tr>
<td>Sig.</td>
<td>N.S</td>
<td>*</td>
</tr>
</tbody>
</table>

T1: A control treatment in which birds are fed on a diet without additives. T2: fed the birds on a diet supplemented with 400 g / t of zinc methionine. T3: fed the birds on a diet supplemented with 500 g / t of zinc methionine. T4: fed birds on a diet supplemented with 600 g / t of zinc methionine. (Mean ±S.E) means ± standard error. (N.S) No significant differences between mean values. * There were significant differences between the mean values at the probability level (P≤0.05).

**Feed conversion**

Table 5. indicates a significant improvement (P≤0.05) for the feed conversion of T3 and T4 and recorded the best improvement of the feed conversion of 1.75 and 1.74 respectively, compared to T1 (control), which recorded the worst feed conversion was reached 1.80. while T2 did not differ significantly with the treatment of T1 (control), and T3 and T4 were not different. The improvement in the feed conversion may be due to the introduction of zinc in the synthesis of fatty acids, which contribute significantly to the improvement of the general health of birds and thus improve the conversion coefficient of food.

**Table 5. Effect of Addition of Different Levels of Zinc Methionine (Zn Met) on feed conversion (g diet/ g weight gain) of broiler (± S.E.).**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Age (week)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>T1</td>
<td>1.59±0.002</td>
<td>1.65 b±0.002</td>
</tr>
<tr>
<td>T2</td>
<td>1.60±0.001</td>
<td>1.64 ab±0.002</td>
</tr>
<tr>
<td>T3</td>
<td>1.60±0.001</td>
<td>1.63 ab±0.002</td>
</tr>
<tr>
<td>T4</td>
<td>1.59±0.001</td>
<td>1.62 a±0.002</td>
</tr>
<tr>
<td>Sig.</td>
<td>N.S</td>
<td>*</td>
</tr>
</tbody>
</table>

T1: A control treatment in which birds are fed on a diet without additives. T2: fed the birds on a diet supplemented with 400 g / t of zinc methionine. T3: fed the birds on a diet supplemented with 500 g / t of zinc methionine. T4: fed birds on a diet supplemented with 600 g / t of zinc methionine. (Mean ±S.E) means ± standard error. (N.S) No significant differences between mean values. * There were significant differences between the mean values at the probability level (P≤0.05).
CONCLUSION

The high levels of zinc methionine (600 mg per ton of feed) resulted in improved all productive traits of broilers compared with other treatments.

Conflict of Interest: None

Funding: Self

Ethical Clearance: Not required.

REFERENCES


Topical Combination of Nifedipine with Lidocaine for Anal Fissure Treatment

Rasha Kadim Albayati¹, Adel Musa Al-Rekabi², Nahedh R. Alammar², Hayder Adnan Fawzi³
¹Department of Surgery, Al-Diwaniyah Teaching Hospital, Al-Diwaniyah, Iraq, ²Department of Surgery, College of Medicine, University of Al-Qadisiyah, Al-Diwaniyah, Iraq, ³Clinical Pharmacy Departments, Baghdad Medical City Hospitals Campus

ABSTRACT

Background: A fissure consist of crack or tear in the vertical axis of the anal canal between the anal verge and the dentate line. Anal fissure is treated by two ways either medical or surgical treatment or both.

Objective: evaluate the healing response of topical application of nifedipine with lidocaine in acute and chronic anal fissure.

Material and method: A prospective study of one hundred patients presented with anal fissure to outpatient surgical clinic in Al-Diwaniyah teaching hospital, the patients divided into two groups, 40 patients (15 males and 25 females) with acute anal fissure, and 60 patients (25 males and 35 females) with chronic anal fissure.

Results: There was no statistically significant difference in the healing rate between acute and chronic lesion, however the rate of healed lesion in acute setting is higher than that of chronic setting (80% vs. 56%).

Conclusion: Topical application nifedipine and lidocaine effective in treating acute anal fissures with the healing response of 85%, and prevent evolution of acute anal fissures to chronic anal fissure.

Keywords: acute, chronic, anal fissure, Medical treatment.

INTRODUCTION

Anal fissure is the most common cause of severe anal pain and bleeding. Anal fissure is an elongated ulcer in anoderm below dentate line, more common posteriorly due to more adherent of anoderm to underlying tissue in posterior midline so the blood supply is significantly low as shown by the Doppler flow-metry study. It is estimated that 25% of a women and 8% of a men have anterior fissure. Constipation and passing of hard faces lead to tearing of the mucosa causing pain and bleeding.

The pain of anal fissure is severe and always disproportionate to the severity of physical lesion, it may be so severe that patients may avoid defecation for days until it becomes inevitable, this lead to harden of a stools, which farther tear the anoderm during defeation. This ulcer is ischemic ulcer and due to hypertonicity of internal anal sphincter due to pain and spasm of sphincter, this causing a vicious cycle and this can lead to chronic anal fissure.

Chronic anal fissure have traditionally managed with lateral internal sphincterotomy or anal dilatation sphincterotomy, however it has been associated with incontinence in up to 35% of patients. Furthermore, this does not take into account normal weakening of the sphincter with age as well as the possibility of future anorectal surgery or obstetrical trauma. Dilatation of the anal canal has also been associated with sphincteric tears and subsequent incontinence. Controlled pneumatic dilatation, however is a variation to the technique that may reduce the risk of sphincter in jury.

More recently, less invasive strategies have been adopted to induce sphincter relaxation topical agents including nifedipine reduce internal sphincter pressure.
and increase blood supply to ischemic ulcer by decreasing the internal anal sphincter tone, and topical agents nifedipine also have anti-inflammatory action. As lidocaine, is the most common topical anaesthetic for anal fissure, which break the vicious cycle of pain.

During pregnancy and following childbirth the fissures occur as a superficial split in anterior anoderm may progress to a chronic anal fissure. A typical fissure may be multiple, off the midline, large and irregular, these may be caused by inflammatory bowel disease, local or systemic malignant, venereal infection (syphilis, HIV) trauma, tuberculosis, and chemotherapy. The aim of the current study to evaluate the healing response of the anal fissure to topical application of nifedipine with lidocaine gel, and prevent evolution of acute anal fissure to chronic anal fissure.

MATERIAL AND METHOD

A prospective study carried out in the surgical outpatient clinic of AL-Diwaniyah teaching hospital from January 2017 to January 2018. The study included one hundred patients, each patients were followed up during the admission period, examination of the anal fissure and its signs, like puckered or spatulated anus, anal sphincter tone by doing per rectum examination (subjective feeling) for the chronic fissure to decided wither its tight or relax, examination for the skin tag (present or absent), and also examination for pressure which indicate the chronicity of anal fissures.

After that the patients were given the formula (cream Nifedipine (0.3%) – lignocaine (1.5%) Combination) and explain to them who to use the formula, the frequency of visit every two weeks to evaluate the response to the formula.

According to the signs and symptoms, the patients were divided into two groups, the first group with acute anal fissure (15 males and 25 females) and second group with chronic anal fissure (25 males and 35 females). In Both groups patients were instructed to apply cream locally into the anal canal twice daily for 3 weeks after defecation.

Anal fissure was defined as acute when its symptoms (moderate to severe pain during defecation, bleeding per rectum) is within 3 to 6 weeks of onset, the patients were assessed with history and physical examination. Chronic anal fissure defined by duration of symptoms longer than 3 months, the presence of induration at fissure edges, sentinel pile, hypertrophied anal papillae, and circular muscle fibres at the base of the cutaneous defect. The response was shown as stopping or decreasing the bleeding, decreasing the pain, the relaxation of internal anal sphincter and disappearance the induration.

STATISTICAL ANALYSIS

Analysis of our data done using the software program: SPSS 21 (Statistical Package for Social Sciences). Numeric data were represented by the mean ± standard error, while the categorical data represented by numbers and percentages. Independent t-test was used to study the difference between two. For the study of the association between categorical data, the Chi-Square test used. The significant level considered when the P value < 0.05.

RESULTS

There was no statistically significant difference in the healing rate between acute and chronic lesion, however the rate of healed lesion in acute setting is higher than that of chronic setting (80% vs. 56%)

Table 1: healing of lesions in male after 6 weeks

<table>
<thead>
<tr>
<th></th>
<th>Healed</th>
<th>Not healed</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute (15)</td>
<td>12 (80%)</td>
<td>3 (20%)</td>
<td>0.123</td>
</tr>
<tr>
<td>Chronic (25)</td>
<td>14 (56%)</td>
<td>11 (44%)</td>
<td></td>
</tr>
</tbody>
</table>

There was no statistically significant difference in the healing rate between acute and chronic lesion.

Table 2: healing of lesions in male after 8 weeks

<table>
<thead>
<tr>
<th></th>
<th>Healed</th>
<th>Not healed</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute (15)</td>
<td>13 (86.7%)</td>
<td>2 (13.3%)</td>
<td>0.591</td>
</tr>
<tr>
<td>Chronic (25)</td>
<td>20 (80%)</td>
<td>5 (20%)</td>
<td></td>
</tr>
</tbody>
</table>

There was no statistically significant difference in the healing rate between acute and chronic lesion, however the rate of healed lesion in acute setting is higher than that of chronic setting (80% vs. 57.1%)
Table 3: healing of lesions in female after 6 weeks

<table>
<thead>
<tr>
<th></th>
<th>Healed</th>
<th>Not healed</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute (25)</td>
<td>20 (80%)</td>
<td>5 (20%)</td>
<td>0.064</td>
</tr>
<tr>
<td>Chronic (35)</td>
<td>20 (57.1%)</td>
<td>15 (42.9%)</td>
<td></td>
</tr>
</tbody>
</table>

There was no statistically significant difference in the healing rate between acute and chronic lesion.

Table 4: healing of lesions in female after 8 weeks

<table>
<thead>
<tr>
<th></th>
<th>Healed</th>
<th>Not healed</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute (25)</td>
<td>23 (92%)</td>
<td>2 (8%)</td>
<td>0.455</td>
</tr>
<tr>
<td>Chronic (35)</td>
<td>30 (85.7%)</td>
<td>5 (14.3%)</td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

Today, the treatment of chronic anal fissure has become challenging because of irreversible damage and deformation of the internal anal sphincter. Additionally, given that most patients with anal fissure are young and worried about non-voluntary faeces excretion and the consequences after surgery, the use of alternative medicines for treating patients with anal fissure has been of recent concern.

In the current study the healing response of acute anal fissure (AF) after (6 weeks) for both females were 80%, and after extended therapy (8 weeks) the healing response of acute anal fissure for females was 92% and for males were 86.7%, our findings were in agreement with Antropoli et al in which 141 patients treated with nifedipine topically (0.2% nifedipine gel) every 12 hours for three weeks they reported a total remission from acute anal fissure after 21 days of therapy to be 95%.

In the Golfam et al. study, recovery and healing of the pain in the nifedipine group were significantly different from that of the control group.

Oral and topical calcium channel blockers (CCBs) have recently been shown to lower the anal resting pressure by relaxing the internal anal sphincter. The transport of calcium through the L-type calcium channels is important for the maintenance of internal anal sphincter tone. As opposed to glyceryl trinitrate, which reduces resting anal tone by releasing nitric oxide, nifedipine (a calcium channel blocker) reduces the tone and spontaneous activity of the sphincter by decreasing the intracellular availability of calcium.

CONCLUSION

Topical application nifedipine and lidocaine effective in treating acute anal fissures with the healing response of 85%, and prevent evolution of acute anal fissures to chronic anal fissure.

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. Approved by Al-Diwaniyah teaching hospital, department of surgery.
Source of Funding: The work were supported by authors only

REFERENCES


5. Lund JN, Scholefield JH. Glyceryl trinitrate is an effective treatment for anal fissure. Diseases of the colon and rectum. 1997;40(4):468-70,


12. Singh B, Khichy S, Kumar A, Singh S, Neki N. COMPARATIVE STUDY TO OBSERVE EFFECTS OF TOPICAL NIFEDIPINE WITH LIGNOCAINE AND TOPICAL SUCRALFATE WITH LIGNOCAINE IN ACUTE ANAL FISSURE. Journal of Advanced Medical and Dental Sciences Research. 2016;4(6):81,


Relationship between Diabetes Mellitus and Tuberculosis in Indonesia

Indriya Wardhani¹, Mondastri Korib Sudaryo²

¹Master of Epidemiology, School of public Health, University Indonesia,  
²Departement of Epidemiology, School of public Health, University Indonesia

ABSTRACT

Backgrounds: Tuberculosis was one of the 10 caused of death in the world. Tuberculosis was caused by *mycobacterium tuberculosis* which was transmitted through droplets. One risk factor for tuberculosis was diabetes mellitus. The risk of death due to tuberculosis in people who had diabetes would be higher than whom did not have tuberculosis. This study was aimed to determine the relationship between diabetes mellitus and tuberculosis.

Method: This study used a cross sectional study design. The data analyzed were 34,257 people who participated in the Indonesia Family Life Survey 5 in 2013-2014. Prevalence Odds Ratio crude, Prevalence of adjusted odds ratios and 95% CI were calculated using the chi-square and the multivariate binary logistic.

Result: The prevalence of tuberculosis in this study was 6.6%. From the chi-square results there was a significant relationship between diabetes mellitus and tuberculosis with POR 3.88 (2.49-6.05). Multivariate binary logistic result was a significant relationship between diabetes mellitus and tuberculosis with POR 4.93 (3.01-8.1) after being adjusted by confounder variables.

Conclusions: There was a significant relationship between diabetes mellitus and tuberculosis.

Keywords: Diabetes Mellitus, Tuberculosis, Indonesia

INTRODUCTION

Tuberculosis was one of the top 10 caused of death in the world¹. Tuberculosis caused by *mycobacterium tuberculosis* which was transmitted through droplets. Every one positive smear would transmit 10-15 people or 17% probability of infected each contact². About a quarter of the people in the world had latent tuberculosis where the person had been infected with *mycobacterium tuberculosis* but they were not sick and could not transmit it. In 2017, 10 million people suffered from tuberculosis and 1.6 million people died. Two-thirds tuberculosis cases in the world were India, China, Indonesia, Philippines, Pakistan, Nigeria, Bangladesh and South Africa. The prevalence of Tuberculosis at Indonesia in 2016 was 361,893 residents³. 

WHO had set a target for ending TB endemic by 2030 by reducing the mortality rate by 95% and the incidence rate by 90% by 2035⁴. The success rate of treatment for all tuberculosis cases in 2017 was 85%, this number had increased from the previous year. To achieve it, we must take preventive actions besides success rate of treatment targets. People of productive age, malnutrition or diabetes, HIV, and smoker had high risk of tuberculosis. People with weak immunity due to chronic diseases such as diabetes mellitus had a high risk of getting tuberculosis. 15% of cases of tuberculosis in the world was probably related to diabetes mellitus. The risk of death due to tuberculosis in people who had diabetes would be higher than those who did not have tuberculosis. 7.9% of cases of tuberculosis in the world were caused by smoking⁵. Based on research in China by Zhang et al., smoking could increase the risk of tuberculosis by 1.28 times⁶. The largest proportion of tuberculosis cases in Indonesia in 2016 at the age of 25-34 years was 18.07% followed by age 45-54 at 17.25%⁷.

Corresponding Author:
Mondastri Korib Sudaryo.
Email: maqo19@gmail.com
Based on a retrospective cohort study in Taiwan in 2011-2012 by Yen et al., underweight could increase the risk of death from tuberculosis by 2.14(5). Poor ventilation could facilitate the spread of *mycobacterium tuberculosis* by air. Based on research conducted by Halim, Naning and Satrio poor ventilation could increase the risk of tuberculosis by 2.21 times(6).

Based on the explanation above, the researcher wanted to know the relationship between diabetes mellitus and tuberculosis.

**METHOD**

This research used cross sectional study design. This study used Indonesian Family Life Survey (IFLS) data 5. The survey was conducted by the University of Southern California and RAND in 13 provinces in 2014 to 2015(7). The survey was carried out by observation, interviews, and measurements on weight and height. The sample used in this study amounted to 34,256 people. In this study using all respondents aged ≥15 years who took the IFLS survey 5. In this study the exposure was diabetes mellitus and its outcome was tuberculosis. Determination of tuberculosis status by interviewing whether the respondent had or had not been diagnosed with tuberculosis by a doctor. Determination of DM status by interviewing whether the respondent had or had not been diagnosed with DM by a doctor.

Measurements of body weight and height were carried out by trained interviewers. Variable BMI (Body Mass Index) uses the category by Ministry of Health there were(8):

- Skinny category : BMI <18.5
- Normal category : BMI ≥18.5 - <24,9
- Fat category : BMI ≥25.0 - <27.0
- Category of obesity : BMI ≥27.0

For smoking behavior variables, education was also obtained by interview method. Whereas the variable of house ventilation and the type of house floor were obtained by observation by the interviewer. Age variables used the age category by statistics Canada there were(9):

- Children : 0-14
- Youth : 15-24 years
- Adult : 25-64 years
- Elderly : >65 years old

Data processing was started by merge data so it became a data set that matches the selected variable. Then re-coding and categorizing the variables of age, BMI, education, smoking behavior, number of cigarettes consumed, type of floor, and cooking fuel. Data analyzed were descriptive analysis, bivariate analysis, and cox regression analysis.

**RESULTS**

This study with a total sample of 34,257 after the data cleaning process contained missing data were on sex variables (6 respondents), age variables (7 respondents), education variables (93 respondents), BMI variables (2,035 respondents), cooking fuel variables (50 respondents), ventilation variables and type of floor (1 respondent). Table 1 was the characteristics of the respondents there were gender, age, education, smoking behavior, cigarette consumption per day, body mass index, ventilation conditions, type of house floor and cooking fuel for tuberculosis. Table 1 also provided potential confounders. Variables that had the potential as confounders were gender, age, education, smoking behavior, body mass index, type of house floor and cooking fuel.

Table 1. The Characteristic Respondents of Tuberculosis

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Tuberculosis</th>
<th>Total</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (%n)</td>
<td>No (%n)</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man</td>
<td>874 (5,4)</td>
<td>15.459 (94,6)</td>
<td>16.333 (47,7)</td>
</tr>
<tr>
<td>Woman</td>
<td>1.385 (7,7)</td>
<td>16.534 (92,3)</td>
<td>17.919 (52,3)</td>
</tr>
<tr>
<td>Missing</td>
<td>6 (0,0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In this study physicians who had been diagnosed with tuberculosis by 2,260 (6.6%) people, and those who had never been diagnosed with tuberculosis were 31,998 (93.4%) people. In sex variable, the highest was woman with 17,919 (52.3%) people, while the largest age group was in the 25-64 year age group with 24,399 (71.2%) people. The most moderate education variable was 17,550 (51.2%) people, while the most body mass index (BMI) with the normal category was 17,990 (52.5%) people. In the smoking variable the largest proportion of non-smoking was 21,671 (63.3%) people, and cigarette consumption was ≤18 cigarettes per day amounting to 32,223 (94.1%) people. A total of 29,405 (85.8%) respondent had good house ventilation, while the most variable type of house floor was a type of non-soil floor of 32,940 people (96.2%). Variable non-risk cooking fuels was 27,106 (79.1%) people. In table 1, it can be seen that there were a lot of tuberculosis in women of 1,385 (7.7%), and in age group of >65 years was 322 (12.4%). High education amounted to 626 (13.5%) people with normal category BMI of 833 (8.3%) people and had a smoking behavior of 196 (11.7%) people with consumption of cigarettes > 18 cigarettes per day of 150 (7.4%) people were have higher prevalence of

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>15-24 years</th>
<th>25-64 years</th>
<th>&gt;65 years</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>337 (4,7)</td>
<td>1,600 (6,6)</td>
<td>322 (12,4)</td>
<td>7 (0,0)</td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
<td>1,016 (5,8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>626 (13,5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skinny</td>
<td>610 (5,1)</td>
<td>11,385 (94,9)</td>
<td>11,995 (35,0)</td>
<td>0,000</td>
</tr>
<tr>
<td>Normal</td>
<td>1,051 (5,8)</td>
<td>16,939 (94,2)</td>
<td>17,550 (51,2)</td>
<td>0,000</td>
</tr>
<tr>
<td>Fat</td>
<td>833 (8,3)</td>
<td>9,208 (91,7)</td>
<td>10,041 (29,3)</td>
<td>0,000</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>486 (4,5)</td>
<td>10,426 (95,5)</td>
<td>10,912 (31,9)</td>
<td>0,000</td>
</tr>
<tr>
<td>No</td>
<td>1,578 (7,3)</td>
<td>20,093 (92,7)</td>
<td>21,671 (63,3)</td>
<td>0,000</td>
</tr>
<tr>
<td>Ever Smoking</td>
<td>196 (11,7)</td>
<td>1,479 (88,3)</td>
<td>1,675 (4,9)</td>
<td></td>
</tr>
<tr>
<td>Cigarette Consumption per Day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤18 cigarette</td>
<td>2,110 (6,5)</td>
<td>30,113 (93,5)</td>
<td>32,223 (94,1)</td>
<td>0,147</td>
</tr>
<tr>
<td>&gt;18 cigarette</td>
<td>150 (7,4)</td>
<td>1,885 (92,6)</td>
<td>2,035 (5,9)</td>
<td></td>
</tr>
<tr>
<td>Ventilation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>1,971 (6,7)</td>
<td>27,434 (93,3)</td>
<td>29,405 (85,8)</td>
<td>0,052</td>
</tr>
<tr>
<td>Poor</td>
<td>289 (6,0)</td>
<td>4,563 (94,0)</td>
<td>4,852 (14,2)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Floor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td>39 (3,0)</td>
<td>1,278 (97,0)</td>
<td>1,317 (3,8)</td>
<td>0,000</td>
</tr>
<tr>
<td>Non Soil</td>
<td>2,221 (6,7)</td>
<td>30,719 (93,3)</td>
<td>32,940 (96,2)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking Fuel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Risk</td>
<td>238 (3,4)</td>
<td>6,864 (96,6)</td>
<td>7,102 (20,7)</td>
<td>0,000</td>
</tr>
<tr>
<td>Non Risk</td>
<td>2,018 (7,4)</td>
<td>25,088 (92,6)</td>
<td>27,106 (79,1)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Subjects with high prevalence of tuberculosis had good house ventilation amounted to 1,971 (6.7%) people, and non-soil type of floor house were 2,221 (6.7%) people. Subjects with high prevalence of tuberculosis using non-risk cooking fuels were 2,018 (7.4%) people.

Table 2. Analysis of bivariate and multivariate mellitus diabetes and tuberculosis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Tuberculosis (N=34,257)</th>
<th>POR crude</th>
<th>95% CI</th>
<th>Pvalue</th>
<th>POR adj</th>
<th>95% CI</th>
<th>Pvalue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DM</td>
<td>25</td>
<td>1.1</td>
<td>92</td>
<td>0.3</td>
<td>3.88</td>
<td>2.49-6.05</td>
<td>0.000</td>
</tr>
</tbody>
</table>

In table 2 it can be seen that there was a relationship between diabetes mellitus and tuberculosis. People with diabetes mellitus had a risk of 3.88 (95%CI 2.49-6.05) times for tuberculosis rather than whom did not have diabetes mellitus. Multivariate analysis is done by entering all variables suspected of being confounders. The POR after adjusted variables of sex, age, education, smoking behavior, body mass index, type of house floor and cooking fuel was 4.93 (95%CI 3.01-8.1).

**DISCUSSION**

The prevalence of tuberculosis in this study was 6.6% (2,260) of 34,257 respondents. Tuberculosis was common in women, age groups > 65 years, higher education, fat BMI, ever smoking behavior, type of floor of the house that was not soil, and non-risk cooking fuel. There was a significant relationship between diabetes mellitus and tuberculosis (POR 3.88 95%CI 2.49-6.05). After being controlled by the confounder variable there was a significant relationship between diabetes mellitus and tuberculosis (POR 4.93 95%CI 3.01-8.1).

In case-control research conducted by Alisjahbana et al., diabetes mellitus was increase the risk of OR 4.7 (95%CI 2.7–8.1) tuberculosis. After adjusted variable confounders (such as socioeconomics, environmental factors, contact with patients, and history of tuberculosis) the result did not reduce the strength of the association between diabetes mellitus and tuberculosis(10). This was consistent with the systematic review conducted by Al-Rifai et al., that diabetes mellitus patients had 3.59 times (95%CI 2.25–5.73), 1.55 times (95%CI 1.39–1.72), and 2.09 times (95%CI 1.71–2.55 ) increased risk of active prospective in four TB, 16 retrospective, and 17 case-control studies. Diabetes mellitus with uncontrolled blood sugar had a higher risk of developing tuberculosis compared to diabetes mellitus with controlled blood sugar(12). In a cohort study in Australia conducted by Dobler, Flack and Marks diabetes mellitus increases the risk of tuberculosis 1.48 (95%CI 1.04-2.10) in people with diabetes mellitus and 2.27 (95%CI 1.41 -3.66) in people with diabetes mellitus who use insulin. In this study also states that the attributable risk was small, so that if the incidence of diabetes mellitus in the population was high, screening and treatment of diabetes mellitus patients was necessary(13). According to Harries et al., and Dooley and Chaisson it was more reliable to screening tuberculosis patients when patients undergo treatment compared to the start of treatment. Tuberculosis was a chronic disease that is likely to increase blood sugar due to cytokine stimulus, causing false positive diabetes mellitus if screening is too early(14)(15).

In a study conducted by Workneh, Bjune and Yimer in ethiopia, stated that the risk of tuberculosis with diabetes mellitus dying increased 3.96 (1.76–8.89) times compared with no diabetes mellitus. This may be due to poor glycemic control and impaired immune cells in patients with diabetes mellitus(16). This is according to what was done in a study conducted by Martens et al., in mice, that mice have acute diabetes mellitus will be exposed to tuberculosis after 4 weeks of infection(17). According to Dooley and Chaisson, diabetes mellitus.
increased sensitivity to *mycobacterium tuberculosis* through multiple mechanisms. The mechanisms directly related were hyperglycemia and cellular insulinopenia, and indirect effects on the macrophage and lymphocyte function. Most important cells in prevented tuberculosis infection were phagocytes (alveolar macrophages and their precursor monocytes) and lymphocytes.

The limitations of this study was the use of interview methods for smoking behavior variables so that the results are likely to be underestimated. The use of interviews with tuberculosis and diabetes mellitus status can result in underestimated results. While the variable of home ventilation was only done by observation by the interviewer without any measurement. The results of this study had controlled confounder variables, but there were potential confounder who had not been controlled such as social economy and contact with tuberculosis patients.

**CONCLUSION**

The results of this study there was a relation between diabetes mellitus and tuberculosis. This study was present information for tuberculosis prevention and further research.

**Funding:** This study was supported by the International Indexed Publication for Student Final Projects Grant 2018 from the Research and Community Development Center of the University of Indonesia.

**Conflict of Interest:** None declared

**Acknowledgment:** We are grateful for the data provided by the Indonesian Family Life Survey. We are thankful to the Research and Community Development Center of the University of Indonesia for the financial support.

**Ethical Clearance:** The IFLS surveys and their procedures were properly reviewed and approved by IRBs (Institutional Review Boards) in the United States (at RAND) and in Indonesia at the University of Gadjah Mada (UGM) for IFLS5. Ethical clearance taken from IRB (institutional Review Boards) committee Thus all requirements for consent for adults and children were met and approved by those IRBs before fieldwork could begin.

**REFERENCES**


ABSTRACT

Background: Indonesia is a third rank in TB cases worldwide. TB is a disease caused by multifactors where the environment interacts with host-related factors. So, the study was conducted to identify the multifactors and to get the main risk factor of pulmonary TB AFB positive in Indonesia.

Method: A cross-sectional study. Subjects were the age group ≥15 years who were followed by the interview and had complete data. P-value <0.025 was considered statistically significant and included to final model by screening the factors which able to predict the prevalence of pulmonary TB.

Results: The prevalence of pulmonary TB AFB positive was 1.72%. Chi square test showed statistically significant association against pulmonary TB were gender OR=1.42(1.26-1.60), Diabetes Mellitus history OR=3(2.35-3.82), Contact with active TB patients OR=3.49(2.90-4.20). Multivariate analysis showed, Active smoker, gender, age category, contact with active TB patients, and diabetes mellitus history had role against pulmonary TB AFB positive in Indonesia. The main risk factor was active smoker OR=3.71.

Conclusion: Age, gender, diabetes mellitus, active smoker, and contact with active TB patients were significantly risk factors to predict pulmonary TB. Active smoker had 3.71 greater risk of having pulmonary TB compared with non pulmonary TB.

Keywords: Risk factors, pulmonary TB AFB positive, Indonesia

INTRODUCTION

Globally, it was estimated 10.0 million people (9.0–11.1 million) developed TB disease in 2017. The highest cases countries: India (27%), China (9%), Indonesia (8%), the Philippines (6%), Pakistan (5%), Nigeria (4%), Bangladesh (4%) and South Africa (3%)1). Earlier in the 20th century, the discipline of pulmonology had been driven by epidemic levels of TB in the USA (the rate of PTB in New York City was 247 per 100 000) (2). In 2017, the global incidence for TB was 48.9 per 100 000 males and 39.7 per 100 000 females (3). In 2014, the World Health Assembly embraced an ambitious resolution to reduce deaths from TB by 95% by 2035 (4).

Indonesia is the third rank in TB worldwide. The management of M. tuberculosis infection was a new priority action for “End Tuberculosis Strategy”. Hence, identifying the significant risk factors of TB in Indonesia is essential effort to do. The SDG and End TB Strategy targets set for 2030 cannot be achieved without intensified research/study and development. The main reason, we use this survey to identify risk factors to predict pulmonary TB AFB positive and to get the main risk factor against pulmonary TB in Indonesia.

Study Design and Data Collection

Design was a cross-sectional using Prevalence Survey TB 2013-2014 data. It collected information on individual, household and community level data using multistage cluster stratified random sampling on ≥15
years old\(^5\). Selected cluster was 156 district from 33 provinces in Indonesia. Field supervision during data collection was carried out regularly by the Balitbangkes research team and partners (WHO, KOMLI Tuberculosis, Directorate of Tuberculosis and TORG). Supervised activities included pre-survey, data collection, panel team activities, and data analysis.

**Measures**

The quality of surveys was guaranteed at all stages by recruiting qualified teams, compliance with standard operating procedures for all activities, trials, team training and regular supervision. Socio-Demographic Characteristics and Risk Factors; age, gender, level of education, DM history, tuberculosis history, active smoker, passive smoker, and contact with active tuberculosis patients. Pulmonary TB was defined by the result of microscopic test from respondents’ sputum.

**Statistical Analysis**

Logistic regression was performed to calculate the risk factors and to get the final model of pulmonary TB AFB positive.

### RESULTS

**Table 1. Association of pulmonary TB AFB positive**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Tuberculosis</th>
<th>Non Tuberculosis</th>
<th>Total</th>
<th>OR</th>
<th>95%CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 1,091</td>
<td>n = 62,190</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age Category (years)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>104</td>
<td>14,188</td>
<td>14,292</td>
<td>1</td>
<td>0.21-0.34</td>
<td>0.0001</td>
</tr>
<tr>
<td>25-34</td>
<td>236</td>
<td>14,509</td>
<td>14,745</td>
<td>0.27</td>
<td>0.49-0.71</td>
<td>0.0001</td>
</tr>
<tr>
<td>35-44</td>
<td>246</td>
<td>13,453</td>
<td>13,699</td>
<td>0.59</td>
<td>0.49-0.71</td>
<td>0.0001</td>
</tr>
<tr>
<td>45-54</td>
<td>236</td>
<td>10,185</td>
<td>10,421</td>
<td>0.67</td>
<td>0.56-0.79</td>
<td>0.0001</td>
</tr>
<tr>
<td>≥ 55</td>
<td>269</td>
<td>9,855</td>
<td>10,124</td>
<td>0.85</td>
<td>0.71-1.01</td>
<td>0.070</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>532</td>
<td>35,750</td>
<td>36,282</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>559</td>
<td>26,440</td>
<td>26,999</td>
<td>1.42</td>
<td>(1.26-1.60)</td>
<td>0.0001</td>
</tr>
<tr>
<td><strong>Education Level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>362</td>
<td>21,532</td>
<td>21,894</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>729</td>
<td>40,658</td>
<td>41,387</td>
<td>1.06</td>
<td>(0.94-1.21)</td>
<td>0.321</td>
</tr>
<tr>
<td><strong>DM History</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1018</td>
<td>60,739</td>
<td>61,757</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>73</td>
<td>1,451</td>
<td>1,524</td>
<td>3</td>
<td>(2.35-3.82)</td>
<td>0.0001</td>
</tr>
<tr>
<td><strong>Tuberculosis History</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>61,346</td>
<td>61,346</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1091</td>
<td>1,935</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Active Smoker</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>805</td>
<td>42,784</td>
<td>43,589</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>286</td>
<td>19,406</td>
<td>19,692</td>
<td>0.78</td>
<td>(0.68-0.90)</td>
<td>0.0001</td>
</tr>
<tr>
<td><strong>Passive Smoker</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>410</td>
<td>18,711</td>
<td>19,121</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>681</td>
<td>43,479</td>
<td>44,160</td>
<td>0.71</td>
<td>(0.63-0.81)</td>
<td>0.0001</td>
</tr>
<tr>
<td><strong>Contact with active tuberculosis patients</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>957</td>
<td>59,794</td>
<td>60,751</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>134</td>
<td>2,396</td>
<td>2,530</td>
<td>3.49</td>
<td>(2.90-4.20)</td>
<td>0.0001</td>
</tr>
</tbody>
</table>
The prevalence of pulmonary TB AFB positive in Indonesia was 1.72%. The highest proportion of TB was ≥ 55 years group 2.7%. The proportion of TB in male was 2.1% higher but non TB female was 98.5% higher.

**Table 2. Final Model Prediction**

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>B</th>
<th>df</th>
<th>p</th>
<th>OR</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0.837</td>
<td>1</td>
<td>0.000</td>
<td>2.31</td>
<td>1.99-2.67</td>
</tr>
<tr>
<td>Education</td>
<td>0.162</td>
<td>1</td>
<td>0.014</td>
<td>1.17</td>
<td>1.03-1.34</td>
</tr>
<tr>
<td>DM history</td>
<td>1.027</td>
<td>1</td>
<td>0.000</td>
<td>2.79</td>
<td>2.18-3.57</td>
</tr>
<tr>
<td>Active smoker</td>
<td>-0.773</td>
<td>1</td>
<td>0.000</td>
<td>0.46</td>
<td>0.39-0.54</td>
</tr>
<tr>
<td>Contact with active tuberculosis patients</td>
<td>1.277</td>
<td>1</td>
<td>0.000</td>
<td>3.58</td>
<td>2.97-4.32</td>
</tr>
<tr>
<td>Constanta</td>
<td>-4.454</td>
<td>1</td>
<td>0.000</td>
<td>0.012</td>
<td></td>
</tr>
</tbody>
</table>

The final model to predict of pulmonary TB BFA positive in Indonesia;

| Pulmonary TB = -4.454+0.837(Gender)+0.162(Education)+1.027(DM History)-0.773(Active Smoker)+1.277(Contact with Active Tuberculosis Patients) |

**DISCUSSION**

No difference of education level between TB and non TB. Respondents had DM history and suffered TB 4.8% higher than non TB only 1.6%. Almost non TB had no tuberculosis history (100%). The proportion of TB and no TB between active smoker and passive smoker were the same. In respondents with contact active TB patients, the proportion of TB was 5.3% and non TB was 94.7% while the proportion of no contact with active TB, TB was 1.6% and non TB was 98.3%.

Male have risk 1.42 greater of pulmonary TB. Education level has no significant risk of TB. DM has risk 3 greater of pulmonary. Active smoker and passive smoker were a protective to pulmonary TB. Respondents contact with active TB patients has risk 3.49 greater than those who have no contact.

Risk of pulmonary TB AFB positive could be accurately predicted by gender, education, DM, active smoker, and contact with active tuberculosis patients. Study in Ambo Hospital, the risk of one or more family member with history of TB (OR=4.4;95%CI1.5–12.9) (8). Study in Vietnam found RR of smear-positive disease among household contacts was 6.4 (95%CI,4.5-9.0;P<0.001) (7). Quoted from Ambo Hospital study, 45% of TB cases had a family history of TB compared with 11% of the controls (OR=7.55; P< 0.001). The risk appears to increase when the contact is with a close family member39. Study in China identified the cumulative risk of active TB among close contacts 1.48% (95%CI 1.15%–1.88%) (9).

Study of Ojha Institute, living with TB AFB positive patients are at high risk (8). Although TB control programmes have averted millions of deaths, their effects on transmission and incidence rates are not yet widely detectable (10). The second risk factor is DM. It risks 2.79 times to pulmonary TB. WHO collaborative framework for TB-DM recommends bidirectional screening (9). The global diabetes epidemic is steadily increasing in every country (10,11). High prevalence, severe clinical characteristics and poor outcomes of pulmonary TB patients with DM highlight the necessity of early bidirectional screening and co-management in Shanghai, China (12).

TB-DM comorbidity is characterized by increase inflammation with elevated circulating levels of inflammatory cytokines and other factors (16). Cohort study by Kim found risk of DM RR=3.57 (95% CI 3.07-5.16) (18). Prevalence of DM progressively increased 27.9%. Patients age 55-64 years had the highest association of DM (OR=3.53) compared with those under 45 years (13). Adults with DM had significantly higher odds of TB (aOR 1.90; 95%CI 1.15–3.14) compared to adults.
without DM after adjusting for age, sex, smoking status, history of active TB, and foreign born status\(^{(14)}\).

DM were seven times represented in TB patient population (OR=6.6; 95%CI=3.788–11.60) in comparison to the general population\(^{(15)}\). In Maryland, severity of DM affects the risk of developing TB adjusting for HIV status, age, weight, and foreign birth (OR=6.5 95%CI 1.1–38, \(P=0.039\))\(^{(16)}\). TB infection prevalence among patients with DM type 2 was 51.3%\(^{(17)}\). In Asian population, DM is an independent risk factor for all cause mortality with HRs 1.17–1.27\(^{(13)}\). The peak prevalence of DM observed in countries of Asia, North America, and Oceania\(^{(18)}\). DM increased risk of developing and dying from an infectious disease\(^{(10)}\). TB is the leading killer among global infectious diseases\(^{(35)}\).

The third risk factor is gender. Male have risk 2.31 greater suffer pulmonary TB. Epidemiological information shows the differences between men and women in prevalence of infection, rate of progression from infection to disease, incidence of clinical disease, and mortality due to TB\(^{(20)}\). Study from Iran, The incidence of TB in males and females was 62% and 38%\(^{(21)}\). Study populations in China, Male was significantly associated with increased risk of TB HR 2.36 (95% CI 1.30–4.30)\(^{(22)}\).

South Nigeria; 2625 TB patient, 61.4% were males while 38.6% were females with ratio of 1.59\(^{(23)}\). Male predominance in TB incidence which has been previously explained\(^{(24)}\). Investigation of TB Prevalence in Nigeria Delta, male 63% of the prevalence while females 37%\(^{(25)}\). Kaplan–Meier survival analysis demonstrated significantly higher mortality in the men (\(p=0.005\)). Multivariate analysis, male was an independent risk factor (OR=1.96; 95% CI, 1.12–3.41)\(^{(26)}\).

The fifth, education was the risk factor to TB. Study in US shown under High school graduate had risk 3.23 (95%CI 2.16–4.83) greater to latent tuberculosis infection\(^{(27)}\). Cross-sectional study in Semarang, Indonesia in 2012 found low education was 56.7% and high education was 43.3%\(^{(28)}\).

Finding from this study active smoker is a protective factor (OR=0.46) to prevent pulmonary TB. It is needed continued study to examine the relationship of active smoker on pathophysiology of pulmonary TB to determine the consistency of the effects of active smoker of pulmonary TB AFB positive. Using another design of study which is able to evaluate association between active smoker and tuberculosis correctly. Finding of active smoker in this study shows opposite result from another study. Smoking is causally associated with active tuberculosis\(^{(29)}\). Smoking is significantly associated with pulmonary TB in India (OR for mild, moderate and heavy were 2.28, 2.51 and 2.74)\(^{(30)}\).

**CONCLUSION**

Ministry of health launched “find and treat until healing” program in 2016. One of indicator is case detection rate by investigation contact by health worker with population around index cases. A guideline on investigation among close contacts of infectious cases exist in regulation “Minister of health Number 67 year 2016” mentioned about investigation contact strategy\(^{(31)}\). WHO also has recommended contact investigation. Household contact investigation strategies can bring case detection in community. This strategies are particularly effective in high TB burden regions\(^{(32)}\).

TB is a major cause illness and death worldwide especially in Asia and Africa. DOTS has lead to significant increase in the treatment success (82.7%) (WHO target 85%) and decrease in the default and failure rates \((40)\). Continued program collaboration between TB and DM programs will help to integrate public health programs. DM is risk factor for the development of pulmonary TB and both disease present endocrine alterations likely to play in certain immune-endocrine-metabolic associated disorders\(^{(39)}\).

Screening for active tuberculosis in DM should lead to earlier detection of TB\(^{(33)}\). Monitoring, recording and reporting on case numbers and outcomes are responsibility of collaborative framework between TB and DM programs. TB control in low and middle income countries are isoniazid preventive therapy for preventing TB among HIV and household contacts of infectious TB patients, clinical algorithms for diagnosing smear-negative TB disease in patients seeking care, screening algorithms for excluding TB-HIV-infected individuals eligible for preventive therapy, and programmatic provision of second-line treatment for multidrug-resistant TB\(^{(34)}\).

**Ethical Considerations:** Ethics testing conducted by the Balitbangkes ethics committee. Written informed consent was obtained from all respondents before data collection was carried out.
Limitations

This study is a secondary data analysis, not all covariate variables were examined.

Conflict of Interest: Both author declared that no competing interest exist.

Acknowledgement: We thank to the Research and Community Development Center of University of Indonesia for the financial support and to Indonesian Ministry of Health who provided the data survey.

REFERENCES


33. Liang Li, Yan Lin, Fengling Mi, Shouyong Tan BL. Screening of patients with tuberculosis for diabetes mellitus in China. 2012;17(pp1294-1301).


The Achievement of Ministry of Health Polytechnic Semarang as an Excellent Service University Upon Implementing a Decade of Internal Quality Assurance System

Lanny Sunarjo¹, Enik Sulistyowati¹, Triana Sri Hardjanti¹, Supriyadi¹
¹Ministry of Health Polytechnic, Semarang, Indonesia

ABSTRACT

Background: Since 2007 the head of the Semarang Health Ministry Polytechnic has established and implemented an Internal Quality Assurance System to guarantee the quality of services and graduates as well as to oversee the implementation of higher education regulations as a form of public accountability. The research objective was to examine trends in the level of student satisfaction with lecturer performance and education administration services since the quality assurance was implemented for a decade.

Method: The number of samples ranged from 10-20% with a random sampling technique from the population of Semarang Health Ministry Polytechnic students ranging from 5000 to 7,000 people spread across 7 campuses in 5 different cities in Central Java. Student satisfaction with lecturer performance and educational administration services is measured by giving questionnaires to students and then the data are analyzed by statistical correlation test of Pearson Product Moment.

Results: The results showed that for a decade the level of student satisfaction with lecturer performance and educational administration services continued to increase. There is a significant relationship between student satisfaction with education administration services.

Conclusion: Further research is qualitatively needed to assess the level of student satisfaction in a holistic manner related to matters that are considered important by students on lecturer performance and educational administration services.

Keywords: Excellent Service, Quality Assurance, Health Polytechnic, A Decade.

INTRODUCTION

Ministry of Health Polytechnic Semarang (MHPS) as one of the government-owned educational institutions that provide health education services in Indonesia is a community service institution that is an integral part of the national education system. Students are users of educational services, and administrative services are the essential resources for educational institutions (1). Research on the level of student satisfaction with MHPS services shows that the level of student satisfaction is highest in aspects of lecturer performance, administrative and laboratory services (2). Measuring the level of student satisfaction with lecturers’ performance and administrative services in 1 decade (consecutive time) is very necessary for educational institutions as the primary capital in developing strategies to improve the quality of teaching, learning, various supporting services, and infrastructure. Improper strategy formulation can have a severe impact on institutions regarding improving the quality of education, design and curriculum development and institutional reputation (3). On the other hand, if the strategy is formulated appropriately can have a significant impact on these matters above.

To improve and guarantee the quality of services and graduates, since 2007 PKS has implemented an ISO 9001-based Internal Quality Assurance System (SPMI) and obtained an ISO 9001 certificate in 2009 and obtained recertification every 3 years until June 2018. Based on the Decree of the National Accreditation Board of Universities High No. 0365 / SK / BAN-PT / Accredited / PT / 1 / 2017, MCC institutions have been...
accredited with Good status. The accreditation of study programs is carried out by the Independent Accreditation Institution of Health Higher Education resulting in almost 50% of the 14 study programs with the A status accreditation (Excellent).

The level of student satisfaction with educational administration services is essential for higher education providers. The service is categorized as quality if the service received is following the expected service. The quality of higher education services is divided into 3 (three) dimensions, namely service to students, lecturers’ abilities/performance and the physical environment of universities. The mission of MHPS is to organize a professional learning and teaching process. To support the implementation of the mission, it is necessary to analyze the extent to which the institution has provided services to its customers. Besides that, this is also an effort to support MHPS to maintain the certificate of ISO 9001 (Quality Management System) and improve the results of study program accreditation.

Since 2009 MHPS has been measuring and evaluating customer satisfaction every year, especially in the academic process which is the primary process of the education services business provided, based on the things mentioned above, the author wishes to examine the trend of the level of student satisfaction on the performance of lecturers and educational administration services from 2009 to 2017.

METHODOLOGY

This study included descriptive analytic research. The research data used were primary data from 2009 - 2017. Data collection techniques were used through observation, questionnaires, documents, and literature. The population is students spread across 7 campuses in 5 different cities in Central Java (Semarang, Magelang, Blora, Pekalongan, and Purwokerto) with an average of 5000-7000 students per year. Sampling is done by random sampling technique. The number of samples is calculated according to the formula as below:

\[ n = \frac{Z^2 \cdot \frac{1}{2} \cdot P \cdot (1-P) \cdot N}{d^2 \cdot (N-1) + Z^2 \cdot \frac{1}{2} \cdot P \cdot (1-P)} \]

\( d = \) precision = 5%
\( N = \) the number of students PKS
\( Z = 1.96 \)

Based on this formula, each year the number of samples is obtained as follows:

Table 1. Sample Distribution

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Samples (People)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>556</td>
</tr>
<tr>
<td>2010</td>
<td>624</td>
</tr>
<tr>
<td>2011</td>
<td>601</td>
</tr>
<tr>
<td>2012</td>
<td>512</td>
</tr>
<tr>
<td>2013</td>
<td>860</td>
</tr>
<tr>
<td>2014</td>
<td>850</td>
</tr>
<tr>
<td>2015</td>
<td>850</td>
</tr>
<tr>
<td>2016</td>
<td>850</td>
</tr>
<tr>
<td>2017</td>
<td>1150</td>
</tr>
</tbody>
</table>

Measurement of perceptions held students on lecturer performance and institutional administration services by giving questionnaires answered with Likert scale ranging from Excellent (5), Good (4), Satisfactory (3), Poor (2), and Awful (1).

Items used to measure lecturer performance include: timeliness in the teaching and learning process, material mastery, the ability to arouse student attention to the courses given, ability to create student activities in thinking and acting, the ability to connect the lessons provided with the students’ knowledge or experiences, the ability to choose the right learning media, providing refreshing on the material taught, giving opportunities for students to play an active role in group work, ability to understand and treat students according to their characteristics, and providing evaluations describing student progress, achievements, as well as shortcomings must be corrected.

The items used to measure educational administration services include the availability of learning physical administration facilities, accessibility and dissemination of learning administration service procedures, availability of building physical facilities, availability of physical media for learning, availability of administrative officers provide services, willingness of administrative officers to help and deliver services quickly, the friendly and trustworthy administrative officers and the attentive administrative officers.
The relationship between lecturer performance and educational administration services with student satisfaction was analyzed by using Pearson Product Moment correlation test with $\alpha = 0.05$.

**RESULTS**

The results of the validity test on lecturer performance variables between 0.508 to 0.698 and educational administration service variables are between 0.545 to 0.75. This shows that item statements to measure the variables of the performance of lecturers and educational administration services are valid. Further, the values of Cronbach’s alpha ranged from 0.881 to 0.889. Thus the value of Cronbach's alpha on lecturer performance variables and education administration service variables is above 0.8 indicating that item statements to measure the variable performance of lecturers and educational administration services are reliable.

Age of respondents ranged from 18 to 22 years where most of the respondents were female (80%). The average level of student perceptions of the performance of lecturers showed that the highest student perceptions scored > 4 on the item "mastery of material" (4.15) and "giving students the opportunity to play an active role in group work "(4.04) while the lowest on the item "timeliness in the teaching and learning process" (3.64).

The level of student satisfaction with the performance of lecturers fluctuated with the lowest in 2010 (score 3.3) and the highest in 2017 with a score of 3.82. Most students (47.9%) are seen as "satisfied," and 37.6% with the category "dissatisfied" to the performance of lecturers and a small proportion of students felt very dissatisfied (7.8%) and very satisfied (6.8%). The highest score of student perceptions was > 4 on the item "availability of learning administration physical facilities in terms of attendance document, college journal, semester learning plan well "(4.04) and the lowest on the item of " availability of building physical facilities like lecture room, discussion and presentation room"(3.75).

The score of student perceptions about the education administration service from 2009 to 2017 increased by 20% from 3.07 to 3.77. Most students (51.6%) were satisfied, and 34% of students felt dissatisfied with the educational administration services that had been done, while 7.5% of students felt very dissatisfied and 6.9% of students felt very satisfied. The results of the correlation analysis between lecturer performance and educational administration services with student satisfaction are shown in Table 2.

**Table 2. Correlation between Lecturer Performance and Educational Administration Services to Student Satisfaction**

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Pearson Correlation</th>
<th>Coefficient of Determination (%)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecturer Performance</td>
<td>0.579</td>
<td>33.50</td>
<td>0.102</td>
</tr>
<tr>
<td>2</td>
<td>Educational Administration Services</td>
<td>0.954</td>
<td>90.90</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 2 shows a significant correlation (p-value <0.001) between educational administration services and student satisfaction levels while lecturer performance is not correlated with the level of student satisfaction.

**DISCUSSIONS**

The score of the level of student satisfaction towards the education administration service of the Ministry of Health Polytechnic Semarang (MHPS) from 2009 - 2017 has increased from year to year ranging from 20% from 3.07 to 3.77, approaching score 4 with satisfying categories. Continuous improvement is in line with the principle of the Internal Quality Assurance System which has been implemented by the Semarang Ministry of Health Polytechnic since 2007 to ensure the quality of services and graduates, oversee the ongoing implementation of higher education and as a form of public accountability, and education administration services begin 2 years later (2019). Improving the quality of education administration services continuously plays an essential role in maintaining and enhancing...
the quality of education management (7). In 2017, the Ministry of Health Polytechnic Semarang received an award certificate from the Ministry of Research and Higher Education, the Directorate General of Learning and Student Affairs for their earnest efforts in realizing a quality culture through the application of the Internal Quality Assurance System or in Indonesia is known as Satuan Pengawas Mutu Internal (SPMI). The use of internal quality assurance is an effort to improve the internal performance of educational institutions, especially teaching and learning methods and processes (8). Since 2007 the MHPS has implemented SPMI based on ISO 9001, over time SPMI has been determined to follow government regulations and refer to the National Standards for Higher Education. The results of the application of SPMI have a significant impact on the results of accreditation, especially the accreditation of study programs, nearly 50% of the total 14 study programs have resulted in A (Excellent) accreditation status, the highest level in Indonesian educational accreditation system.

The results of this study indicate that better education administration services the higher the level of student satisfaction. The highest student perception scores > 4 are found on the item “availability of learning physical administration facilities (attendance document, college journal, semester learning plan) and functioning well.” This result is consistent with the research conducted at the Nusa Dua Tourism College of Bali where academic service quality has a positive and significant effect on student satisfaction by 89.5% (9). Student satisfaction can be increased by improving the quality of educational services through physical evidence variables, reliability, responsiveness, assurance, and empathy (10).

Educational administration services are positively correlated with student satisfaction. The quality of service dramatically influences customer satisfaction — services provided by service providers in proving something that is not really so that consumers can feel the services provided to consumers. Customer satisfaction is determined by various types of services customers get as long as they use several stages of the service. Satisfaction obtained in the early stages of service can lead to perceptions of excellent service quality for the next step so that customers feel satisfied with the overall service. The service situation is related to the internal conditions of the customer so that it affects service performance. Service performance can be determined by function, service process and the physical environment where service is provided. Customer perception of a service is determined by the three things above. Therefore, service providers must provide services beyond what is expected by consumers so that these service providers become the best from other service providers (11).

CONCLUSION

Although students of the Semarang Ministry of Health Health Polytechnic have been satisfied with the performance of lecturers and educational administration services, these institutions must continue to improve and improve SPMI continuously in line with the needs of stakeholders including students. To maintain lecturer performance and educational administration services, institutions need to allocate monetary resources to focus on developing human resources, especially discipline and expanding learning facilities on campus. Further research is qualitatively necessary to assess the level of student satisfaction in a holistic manner related to matters that are considered important by students on lecturer performance and educational administration services.

Ethical Clearance: Ethical clearance was obtained from The Ministry of Health Polytechnic Semarang, Indonesia. We also wish to thank all the participants who contributed to this study.

Conflict of Interest: Nil.

Source of Funding: Nil.

REFERENCES


9. Rinala IN, Yudana IM, Natajaya IN. The effect of academic service quality to students' satisfaction and loyalty in the college of tourism Nusa Dua Bali. Journal of Indonesian Administrative Education. 2013 Sep 16;4(1).


Snakehead Fish \textit{(Chana striata)} Powder Formulation for Increasing Calorie and Protein Intake in Malnourished Children

Magdalena$^1$, Mahpolah$^1$, Ismi Rajiani$^2$

$^1$Ministry of Health Polytechnic Banjarmasin, Indonesia, $^2$Department of Business Administration, STIAMAK Barunawati Surabaya, Indonesia

ABSTRACT

Background: The cases of malnutrition in South Kalimantan are still high, and two districts which are included in the prevalence of undernourishment are South Hulu Sungai District and Batola District. This study aims to increase protein intake in children with malnutrition by giving additional input in the form of snakehead fish powder.

Method: The method of this study was quasi-experimental. This study used two groups with one treatment. The study was conducted at Berangas Health Center, Alalak Sub-District, Barito Kuala District, South Kalimantan. The research subjects were 50 people, with criteria for malnourished children under five who did not increase their weight scales in rows twice. The analysis used the t-test with the significance level used was p <0.05.

Results: There was no difference in calorie intake between the group who received conventional toddler formula and the group who received the fish formula, and there was a difference in protein intake between the group who received conventional toddler formula and the group that received the recommended fish formula.

Conclusion: The formula of snakehead fish is perfect for sufferers of malnutrition because the high protein in snakehead fish contains high levels of albumin that can improve cells and body tissues and help to boost growth in toddlers.

Keywords: Malnutrition, toddlers, snakehead fish, South Kalimantan

INTRODUCTION

Indonesia as a developing country still faces considerable nutritional problems. Malnutrition in children under five occurs because at that age more nutritional needs and toddlers are stages of maturity that are prone to nutrition. Lack of energy and protein is malnutrition due to low consumption of energy and protein in daily food, so it does not meet the nutrition adequacy rate.

Protein deficiency is one of the leading nutritional problems that is often found in toddlers in Indonesia and other developing countries. Protein deficiency has an impact on growth, intellectual development, and productivity between 20 - 30%, while also having a direct effect on morbidity and mortality (1).

Based on Research data in 2013 cases of under nutrition in South Kalimantan were 8.2%, malnutrition 19.2% and tends to continue in recent years. This figure shows that cases of malnutrition in South Kalimantan are still high mainly in two districts: South Hulu Sungai District and Batola District. Malnutrition data in the Berangas Health Center in Alalak Subdistrict, Barito Kuala Regency up to June 2016 were: 1 malnutrition (0.045%), toddler (under the red line) 73 toddlers (3.3%)
and those treated in TFC (Therapeutic Feeding Center) as many as six people. This case increased compared to data in 2015, cases of malnutrition were one person (0.045%), toddlers 53 people (2.31%) and none were treated at TFC. In 2017, malnutrition continued to increase in Alalak District as many as 374 children under five (30.6%) with the highest nutritional status, namely in Beringin Village as many as 57 toddlers (16%) (2).

Nutritional therapy in malnourished children has a significant role in accelerating the healing of diseases. Errors in feeding will slow the healing of the disease. Excess or lack of nutrition can worsen the condition of the child, and can even cause death. Therefore, parents should be informed about the patient’s rights in the care and feeding of malnourished children. Nutritional therapy for sufferers of malnutrition is applied in several phases, namely: the stabilization phase, the transition phase and the rehabilitation phase (3).

Various studies to improve nutritional status in sufferers of malnutrition including by providing snakehead fish extract which has a high albumin content can help increase albumin levels in patients with poor nutrition with low albumin levels below 2.5 mg%. Other studies also reported that the use of snakehead fish as a source of protein turned out to maintain the albumin value of patients hospitalized in the hospital so that it can help speed up the healing process of patients (4). This study aims to determine the formula for fragrant fish to increase calorie intake and protein in children with malnutrition.

**RESULTS**

The difference in calorie intake in the group of malnourished children under five who received formula toddler compared to the group of malnourished children under five who received the formula for snakehead fish was \( p = 0.079 \), which means there was no difference in calorie intake in the two groups. Differences in protein intake in the group of malnourished children under five who received formula toddler compared to the group of malnourished children under five who received snakehead fish formula was \( p = 0, 016 \) which means there is a difference in calorie intake in both groups.

<table>
<thead>
<tr>
<th>Calorie Intake Rate Category</th>
<th>Toddler Formula Group</th>
<th>Snakehead Formula Fish Group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Over</td>
<td>17(68)</td>
<td>7(28)</td>
<td></td>
</tr>
<tr>
<td>b. Good</td>
<td>5(20)</td>
<td>5(20)</td>
<td></td>
</tr>
<tr>
<td>c. Mild Deficit</td>
<td>1(2)</td>
<td>4(16)</td>
<td>0.079</td>
</tr>
<tr>
<td>d. Moderate Deficit</td>
<td>0(0)</td>
<td>2(10)</td>
<td></td>
</tr>
<tr>
<td>e. Severe Deficit</td>
<td>2(10)</td>
<td>7(26)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25(100)</td>
<td>25(100)</td>
<td></td>
</tr>
</tbody>
</table>
Table 1 shows most levels of caloric intake in the group that received toddler formula were in over categories, namely 68% while in the group that received the formula for snakehead fish the biggest category was also over (28%) with p-value = 0.079.

**Table 2. Protein Intake Under Nutrition Patients**

<table>
<thead>
<tr>
<th>Calorie Intake Rate Category</th>
<th>Toddler Formula Group</th>
<th>Snakehead Formula Fish Group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>a. Over</td>
<td>11</td>
<td>44</td>
<td>14</td>
</tr>
<tr>
<td>b. Good</td>
<td>12</td>
<td>48</td>
<td>6</td>
</tr>
<tr>
<td>c. Mild Deficit</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>d. Moderate Deficit</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>e. Severe Deficit</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100</td>
<td>25</td>
</tr>
</tbody>
</table>

Table 2 shows the level of protein intake in the group that received formula toddlers is mostly in the over category, which is 44%, while the group that gets the formula for snakehead the biggest category is also over (64%) with p-value = 0.016.

**DISCUSSION**

Optimizing the handling of nutritional problems in children under five can be done through diversifying the development of additional food formulas by considering the nutritional aspects, health benefits, acceptability, endurance and local food resource advantages —local food material, among others, in the form of snakehead fish (*Channa striat*) (5).

The advantages of snakehead fish include the womb protein is higher than other food ingredients such as eggs, chicken, and beef. Besides, collagen protein of snakehead fish is also lower than livestock meat, which ranges from 3-5% of total protein. Low collagen causes snakehead fish meat becomes easier to be digested by babies, elderly groups, and also people who just recovered from illness. (8). Besides the snakehead fish is known as a fish that can heal wounds, reduce pain, and postoperative discomfort (9). Many snakehead fish are caught in the area the waters of Kalimantan that are not far away from the community living area, and the processing is still limited to being dried fish or sold freshly. Potential of snakehead fish development for other purpose is big but if consumed directly there are still people who don’t feel willing to consume because of the original head shape snakehead fish resembles a snake. If consumed fresh, it requires more seasoning because snakehead fish tastes plain. Processing of fish snakehead into flour can be an alternative in decreasing fishy aroma and enhancing acceptance and consumption of snakehead fish (10).

The level of caloric intake in toddlers who get formulas in the form of biscuits and milk, is more in the over intake category (68%), because the calorie content of cookies every 100 grams is 458 kcal, and in milk powder skim every 100 grams is 362 kcal. The form of food in the form of biscuits which are packaged in dry form becomes small portions, but the calorific value is high. The level of caloric intake in the group that received the formula for snakehead fish was much the same in the category of more consumption (28%) and the level of heavy deficit intake (28%). For comparison, 100 grams of potato contain 83 kcal, skim milk every 100 grams is 362 kcal and fragrant fish every 100 gram is 74 Kcal.

The level of protein intake in group I which received formula for toddlers was at most good intake categories (48%), and protein intake in group II who received the formula for the most type was 64%. The calorific value of fresh fish in 100 grams is 25.2 grams. Herring protein is also high in albumin. The high albumin content in snakehead fish causes this fish is used to overcome hypoalbumin (6).
Based on statistical tests ($p = 0.079$), there was no difference between group I calorie intake (toddler formula) and group II calorie intake (snakehead fish formula), and there was a difference between group I protein intake (formula toddler) with group II (fish formula snakehead) with a value of $p = 0.016$.

Calories in toddler formulas are given according to the condition and condition of toddlers' weight of malnutrition, formula F 100 containing 1000 kcal, protein 29 grams plus 30-gram biscuits at 137.4 kcal, protein 6.9 grams so that it amounts to 1137.4 kcal and 35.9 grams of protein. This can increase calorie and protein intake for all malnourished toddlers. The formula, F 100 consists of 50 grams of sugar, 60 grams of vegetable oil, 80 grams of skim milk, added mineral mix and water could be in the form of a gel, so that it is diluted plus water and stirred until homogeneous, making it easy to consume. The number of Calories in a fragrant fish formula with a composition of 200 grams of potatoes, 10 grams of sugar, 20 grams of skim milk, 50 grams of harp fish, 30 grams of carrots, and 10 grams of vegetable oil for two recipes are 1142 Kcal and 36.6 grams of protein.

The value of calories and protein that are not different in the two formulas can be a reference for giving formulas to better sufferers of malnutrition. The difference in protein intake is more significant in the group that gets the formula for snakehead fish can be provided more often for sufferers of malnutrition. Snakehead fish that have high protein values also contain high albumin, and its function is to maintain fluid balance in the body that can prevent edema (7). Another feature of albumin is to help the formation and repair of cell tissue in the body for the development and growth of thermal children (8).

Snakehead fish has a very high protein content of albumin, the results of the study revealed that in the nutritional content of snakehead fish there was 6.2% albumin. Albumin is a type of protein that is found in 60% of human blood plasma whose function is to maintain and improve tissue and improve health in patients with malnutrition and poor nutrition (9).

**CONCLUSION**

There is no difference in calorie intake in the group that received formula toddlers with a group of toddlers who received formula of fragrant fish. There was a difference in protein intake in the group that received formula toddlers with a group of toddlers who received formula of fragrant fish. The formula of snakehead fish is perfect for sufferers of malnutrition because high protein snakehead fish also contains high levels of albumin that can improve cells and body tissues and help to enhance the growth of toddlers.

**Ethical Clearance:** This study has been conducted an ethical review by the Banjarmasin Ministry of Health Polytechnic Research Ethics Commission with No. 257 / KEPK-PKB / 2018. We also wish to thank all the participants who contributed to this study.

**Conflict of Interest:** Nil.

**Source of Funding:** Nil.

**REFERENCES**


5. Liu A, Zhao L, Yu D, Yu W. Study on malnutrition status and changing trend of children under five years old in China. Wei sheng yan jiu= Journal of
hygiene research. 2008 May;37(3):324-6.


Spatial Analysis of Hypertension Risk Factors Incidence in South Kalimantan Province

Suroto¹, Mahdalena¹, Ismi Rajiani²

¹Ministry of Health Polytechnic Banjarmasin, Indonesia, ²Department of Business Administration, STIAMAK Barunawati Surabaya, Indonesia

ABSTRACT

Background: This study aims to identify spatial effects on risk variables that influence the incidence of hypertension in South Kalimantan Province because the region has specific geographical variations.

Method: The research method used is cross-sectional with a population of all households in the province, city districts in Indonesia. The data to be analyzed in this study is the incidence of hypertension data in 13 regencies of South Kalimantan Province.

Results: It is identified 5 groups of districts/cities in South Kalimantan Province that have similarities regarding risk factors affecting the incidence of hypertension.

Conclusion: The results obtained can be used by the relevant leaders as a consideration in determining policies to suppress and control the incidence of hypertension in the province of South Kalimantan by considering factors related to specific hypertension disease in the regency/city area of each group.

Keywords: Spatial, Hypertension, South Kalimantan, Indonesia

INTRODUCTION

Hypertension is one of the non-communicable diseases that become public health problem (1). Uncontrolled hypertension can lead to degenerative diseases, such as congestive heart failure, kidney failure and vascular disease (2). Hypertension is called the silent killer because it is asymptomatic and can cause fatal strokes. Although it cannot be treated, prevention and management can reduce the incidence of hypertension and accompanying diseases. Hypertension is the number 3 cause of death after stroke and tuberculosis, reaching 6.7% of the death population in all ages in Indonesia (3).

According to the guidelines of the World Health Organization (WHO) in 2011, one billion people in the world suffer from hypertension, two-thirds of whom are in developing countries that are low-middle income (4). The prevalence of hypertension will continue to increase sharply, predicted in 2025 later, around 29% of adults worldwide suffer from hypertension. Hypertension has resulted in the deaths of approximately 8 million people each year, 1.5 million deaths occur in Southeast Asia, of which a third of the population suffers from hypertension (5).

Based on basic health research in 2013, the prevalence of hypertension in Indonesia obtained through measurements at ≥ 18 years of age was 25.8% revealed the highest in Bangka Belitung 30.9%, followed by South Kalimantan 30.8%, East Kalimantan 29.6% and West Java 29.4% (6). The prevalence of hypertension in Indonesia obtained through a questionnaire diagnosed by health personnel was 9.4%, diagnosed by health personnel or taking medication at 9.5%. So there are 0.1% who make their own medicine — respondents who have normal blood but are taking hypertension medication at 0.7%. Thus the prevalence of hypertension in Indonesia is 26.5%.

Corresponding Author:

Suroto
Ministry of Health Polytechnic Banjarmasin, Indonesia
email: surotosyahrani@yahoo.co.id
The aim to be achieved in this study is to identify spatial effects on risk variables that influence the incidence of hypertension in the province of South Kalimantan.

METHOD

This research is a secondary data-based documentation study. To complete the information contained in the research objectives required primary data collection through observational research with a survey approach. The data used were data from the 2013 Basic Health Research (Riskesdas) and BPS. The data is the result of a descriptive cross-sectional survey with a population of all households in the province, city districts in Indonesia. Primary data was also taken through a questionnaire on the respondents include knowledge, attitudes, self-concept, and family support — the location of this research in Banjarmasin Kalimantan Selatan. The research period was 2015 to 2016.

The data to be analyzed in this study is the incidence of hypertension in 13 regencies of South Kalimantan Province.

Table 1: Description of Research Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description of Variables</th>
<th>Types of Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Percentage of residents who have been diagnosed with hypertension / high blood pressure by health personnel</td>
<td>Response</td>
</tr>
<tr>
<td>Variables</td>
<td>Description of Variables</td>
<td></td>
</tr>
<tr>
<td>X_1</td>
<td>Percentage of male population</td>
<td>Predictor</td>
</tr>
<tr>
<td>X_2</td>
<td>Percentage of population with primary education</td>
<td>Predictor</td>
</tr>
<tr>
<td>X_3</td>
<td>Percentage of population with smoking habits every day</td>
<td>Predictor</td>
</tr>
<tr>
<td>X_4</td>
<td>Percentage of people who have moderate physical activity habits.</td>
<td>Predictor</td>
</tr>
<tr>
<td>X_5</td>
<td>Percentage of population who have fruit consumption habits seven times a week</td>
<td>Predictor</td>
</tr>
<tr>
<td>X_6</td>
<td>Percentage of people who have a habit of consuming vegetables seven times a week</td>
<td>Predictor</td>
</tr>
<tr>
<td>X_7</td>
<td>Percentage of people who have a habit of consuming salty food more than one time per day</td>
<td>predictor</td>
</tr>
<tr>
<td>X_8</td>
<td>Percentage of people who have the habit of eating food fat/cholesterol / fried more than one time per day</td>
<td>predictors</td>
</tr>
<tr>
<td>X_9</td>
<td>Percentage of population with medical assurance / veteran / retired</td>
<td>predictors</td>
</tr>
</tbody>
</table>

RESULTS

The full Geographical Weighted Regression (GWR) model for each location is presented in the Appendix. Districts in South Kalimantan Province have different models of the prevalence of hypertension. Based on the variables that are significant for each area, a grouping of districts/cities is formed that has similar variables which significantly influence the prevalence of hypertension. The cluster of districts/cities that have related variables that have a significant effect on the incidence of hypertension is presented in Table 4.
Table 2: District / City Grouping Based on Significance

<table>
<thead>
<tr>
<th>Spatial Groups</th>
<th>Variables significance</th>
<th>Variables Description of Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanah Laut</td>
<td>X3, X4, X6</td>
<td>Percentage of hypertensive patients diagnosed (Y)</td>
</tr>
<tr>
<td>Tanah Bumbu</td>
<td>X3, X4, X6</td>
<td>Percentage of the population of male sex (X₁)</td>
</tr>
<tr>
<td>Kota Baru</td>
<td>X4, X8</td>
<td>Percentage of population with basic education (X₂)</td>
</tr>
<tr>
<td>Banjar</td>
<td>X4, X5, X6, X7</td>
<td>Percentage of population with daily smoking habits (X₃)</td>
</tr>
<tr>
<td>Kota Banjarmasin</td>
<td>X4, X5, X6, X7</td>
<td>Percentage of people with physical activity (X₄)</td>
</tr>
<tr>
<td>Banjar Baru</td>
<td>X4, X5, X6, X7</td>
<td>Percentage of the population consuming fruit - ingredients seven times in 1 week (X₅)</td>
</tr>
<tr>
<td>Barito Kuala</td>
<td>X3, X4, X9</td>
<td>Percentage of people who consume vegetables seven times in 1 week (X₆)</td>
</tr>
<tr>
<td>Tapin</td>
<td>X1, X5</td>
<td>Percentage of people who drink salty food more than 1 time per day (X₇)</td>
</tr>
<tr>
<td>Hulu Sungai Selatan</td>
<td>X1, X5</td>
<td>Percentage of the population consuming fatty food consumption/cholesterol / fried food more than one time per day (X₈)</td>
</tr>
<tr>
<td>Hulu Sungai Tengah</td>
<td>X1, X5</td>
<td>Percentage of population with health insurance ownership (X₉)</td>
</tr>
<tr>
<td>Hulu Utara River</td>
<td>X1, X5</td>
<td></td>
</tr>
<tr>
<td>Tabalong</td>
<td>X1, X5</td>
<td></td>
</tr>
<tr>
<td>Balangan</td>
<td>X1, X5</td>
<td></td>
</tr>
</tbody>
</table>

Grouping based on significant variables is divided into five groups. There are districts/cities that have similar variables that have a significant effect on the surrounding areas, but there are districts/cities that have their uniqueness because the variables that are having a significant impact are not the same.

Based on the results of spatial regression, there are five groups. Districts/cities that have similar variables that have a significant effect on the surrounding districts/cities. The results of the above study indicate that group 1 consists of Tanah Laut and Tanah Bumbu Districts with characteristics Percentage of population with daily smoking habits (X₃), Percentage of people with physical activity (X₄), Percentage of the population consuming vegetables seven times in 1 week (X₆). Group 2, Kota Baru Regency with the characteristics of the percentage of the population having physical activity (X₄), Percentage of the population consuming fatty/cholesterol / fried foods more than once per day (X₇). Group 3 consists of Banjar Regency, Banjarbaru City, Banjarmasin City, with characteristics Percentage of people who have physical activity (X₄), Percentage of people who consume fruits 7 times in 1 week (X₆), Percentage of population consuming vegetables 7 times in 1 week (X₆), the percentage of people who drink salty food more than 1 time per day (X₇). Group 4 in Barito Kuala Regency with characteristics Percentage of population with smoking habits every day (X₃), Percentage of people with physical activity (X₄), Percentage of population with Askes / JPkJ PNS / Veteran / Pension ownership (X₉). Group 5 consists of Tapin Regency, Hulu Sungai Selatan, Hulu Sungai Tengah, Hulu Sungai Utara, Tabalong, Balangan with characteristics Percentage of the population of male sex (X₁), Percentage of the population consuming fruits seven times in 1 week (X₅).

**DISCUSSION**

Spatial analysis is a set of methods for finding and describing the level/pattern of a spatial phenomenon so that it can be better understood. By conducting spatial analysis, new information is expected to emerge which can be used as a basis for decision making in the area under study. The methods used are very varied, from visual observation to the use of mathematics / applied statistics (7).
As a method, spatial analysis seeks to assist planners in analyzing the condition of the problem based on data from the target area. And the concepts that underlie a spatial analysis are distance, direction, and relationships. The combination of the three regarding a region will vary to form a significant difference that distinguishes one location from another. Thus distance, direction, and the relationship between the position of an object in an area with objects in another region will have a clear difference. And these three things are things that are always present in spatial analysis with certain stages depending on the planner’s perspective in looking at a problem of spatial analysis (8).

The analysis using the Geographic Weighted Regression (GWR) method aims to determine the variables that influence the prevalence of hypertension at each observation location, namely the sub-district in the province of South Kalimantan. The result described is the prevalence of hypertension modeling using the Geographic Weighted Regression (GWR) method.

**CONCLUSION**

The results obtained can be used by the relevant leaders as a material consideration in determining policies to suppress and control the incidence of hypertension in the province of South Kalimantan. By considering factors related to specific hypertension disease in the regency/city area of each group.

**Ethical Clearance:** Ethical clearance was obtained from The Ministry of Health Polytechnic Banjarmasin, Indonesia. We also wish to thank all the participants who contributed to this study.

**Conflict of Interest:** Nil.

**Source of Funding:** Nil.

**REFERENCES**

Health Improvement after Childbirth with Traditional Snack Consumption

Serilaila¹, Betty Yosephin Simanjuntak², Lela Hartini³, Mahpolah⁴

¹Department of Midwifery, Ministry of Health Polytechnic Banjarmasin, Indonesia, ²Department of Nutrition, Ministry of Health Polytechnic Bengkulu, Indonesia, ³Department of Midwifery, Ministry of Health Polytechnic Bengkulu, Indonesia, ⁴Department of Nutrition, Ministry of Health Polytechnic Banjarmasin, Indonesia

ABSTRACT

Background: After giving birth, most mothers complain of pain, so they are not fit. Traditional ingredients is usually consumed by postpartum mothers to restore health, but no research has been carried out to find the effectiveness. The study aimed to determine the effect of consuming traditional food called kekerit on fitness by using rats before applied further to human beings.

Method: The study was conducted using randomized pre-post test control group design on female, white rats that were made pregnant and waited until delivery. The sample was 18 rats consisting of 9 treatment groups and nine control groups. The study was conducted at the Laboratory of the Faculty of Veterinary Medicine, Bogor Agricultural University of Indonesia by assessing fitness through swimming three times on days 1, 5 and 11, and then the data were analyzed by employing t-test.

Results: The mean swimming pool of intervention rats 101.00 ± 6.65 seconds compared to controls 68.65 ± 6.58 seconds on the first day and there was a significant difference in the fitness of rats with p = 0.039.

Conclusion: Upon successful completion test on rats, the health of postpartum mothers may be accelerated to recover after consuming kekerit, but further research is needed to examine the feasibility.

Keywords: Fitness, Strength, Post-Partum, traditional snack

INTRODUCTION

After giving birth as many as 76% of women experience at least one health problem within eight weeks after giving birth. Feeling discomfort in the form of pain after childbirth, excessive sweating, breast swelling, constipation, hemorrhoids and perineal pain. Overcoming this problem some people believe in doing taboos. Perform rituals or drink concoctions so that they can improve health and strengthen the body.

The culture of drinking potions, usually herbs, especially Javanese people in Indonesia, is believed to be efficacious as a traditional treatment that is safer and cheaper compared to modern medicine. Mothers do this during pregnancy, childbirth, childbirth, and breastfeeding by 80.5% every day to drink it as an effort to maintain health. This habit occurs in postpartum mothers, especially the Sundanese in the Permu Immigration Village, Kepahiang District, Bengkulu Province, in the form of consuming kekerit as a snack that is believed to be able to restore health during the postpartum.

Kekerits snack is a traditional powdered food consumed during childbirth consisting of grains, discoveries, cooking spices and leaves, roots or stems. Ingredients consist of the keratin grain the form of: Oryza sativa, Arachis hypogaea L, Phaseolus radiatus L, Glycine max, and a little Zea mays ssp. Mays. The herbs and spices: Zingiber officinale rocs, Kaempferia galangal L, Curcuma domestica Val, as well as Various

Corresponding Author:
Serilaila
Department of Midwifery, Ministry of Health Polytechnic Banjarmasin, Indonesia
E-mail: serilaila11@yahoo.co.id
spices: *Myristica fragrans* Hout, *Ammonium cardamom* and other leaves such as medicinal plants (5).

*Kekerit* Snacks have been prepared and made by parents or family since the age of pregnancy over seven months. The way to make it is still simple using all the dried ingredients (the results of drying) are roasted and after being cold pounded until smooth and stored in a jar to be ready to be served. This habit has been passed down from generation to generation, originally from the Sundanese but because of its efficacy, other tribes such as Java, and the Serawai or Rejang tribes from the Bengkulu province also followed, thus becoming the local wisdom of this village (6).

The paradigm that develops in today’s society, consuming *kekerit* as a traditional herb is felt to be beneficial which is harmless and has no side effects. This assumption is not entirely correct, for that there needs to be scientific proof through clinical trials using experimental animals such as a rat. The existence of these tests is expected to be able to find out the benefits of creaking in improving health, especially fitness. The purpose of this study was to determine the effect of consumption of snacks *kekerit* by a rat on physical fitness after childbirth.

**METHOD**

This research was conducted by randomized pre-post test control group design, which is to perform fitness tests in the treatment group by giving extra food *kekerit* while the control consumed only food standard ration from the Food and Drug Supervisory Board of the Republic of Indonesia (BPOM RI). The research was carried out at the Laboratory of the Faculty of Veterinary Medicine, Bogor Agricultural University, from April to September 2016. Samples were used by rat *Striped Sprague Dawley* female who had given birth to 18 children, aged 2.5-3 months, weighing 150-300grams.

Each experimental group was divided into 3 for observation of fitness on days 1, 5 and 11 in the control group or treatment through swimming test. The fitness test is carried out using rat swimming in a rectangular tub filled with water. Each mouse swims three times and counts in seconds from starting to swim to being unable to swim.

Before the treatment, rats were acclimatized for two weeks, and then rats were synchronized lust by using prostaglandin preparations with the double injection method. After that, the rats have been mated together using a 1:3 comparison stud. Then the pregnant rat has waited until they give birth within 22-25 days.

Each rat was given a food ration based on the Indonesian Supervisory Food and Drink Board standard and placed in groups with the same environment and treatment, and the room temperature was set with a range of 20-28°C, 50 + 10% humidity and a 12-hour dark-light cycle (RSPCA, 2011). Shortly after giving birth, the rats were weighed and then the treated rats were fed snacks *kekerit* with through the stomach every day with a dose of 0.370 gr/kg body weight as much as one administration at 9-10 is.

**RESULTS**

The content of substances Nutritional *Kekerit* Snacks

*Kekerit* snacks laboratory tests have been conducted at Bogor Agricultural Biochemistry at the content of nutrients contained in these foods are as follows:

<table>
<thead>
<tr>
<th>Table 1. Substance Nutrient Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>a.</td>
</tr>
<tr>
<td>b.</td>
</tr>
<tr>
<td>c.</td>
</tr>
<tr>
<td>d.</td>
</tr>
<tr>
<td>e.</td>
</tr>
<tr>
<td>f.</td>
</tr>
<tr>
<td>g.</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>a.</td>
</tr>
<tr>
<td>b.</td>
</tr>
<tr>
<td>c.</td>
</tr>
</tbody>
</table>

Source: Biochemical Laboratory, 2016

Examination of bioactive components is analyzed to see whether there is nothing (qualitative) does not assess how much. Qualitative analysis results detected were flavonoids, triterpenoids, phenol and tannin (Table 2).
Table 2. Qualitative Analysis of Bioactive Components

<table>
<thead>
<tr>
<th>Qualitative Analysis</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Alkaloid</td>
<td>Negative</td>
</tr>
<tr>
<td>b. Flavonoids</td>
<td>Positive</td>
</tr>
<tr>
<td>c. Triterpenoid</td>
<td>Positive</td>
</tr>
<tr>
<td>d. Phenol</td>
<td>Positive</td>
</tr>
<tr>
<td>e. Hydroquinone</td>
<td>Negative</td>
</tr>
<tr>
<td>f. Saponin</td>
<td>Negative</td>
</tr>
<tr>
<td>g. Tannins</td>
<td>Positive</td>
</tr>
</tbody>
</table>

Kekerit Snacks Effect Against Rat Physical Activity

Physical healthiness assessment of rats can be seen from the ability to swim and judged by the length of time that can be carried by rats to swim.

Table 3. Effect of Giving Kekerit Snacks Based on Swimming Time

<table>
<thead>
<tr>
<th>Day</th>
<th>Parameters</th>
<th>Control</th>
<th>Treatment</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Second</td>
<td>68.65 ± 6.58</td>
<td>101.00 ± 6.65</td>
<td>0.039 *</td>
</tr>
<tr>
<td>5</td>
<td>Seconds</td>
<td>87.15 ± 18.17</td>
<td>129.50 ± 52.04</td>
<td>0.391</td>
</tr>
<tr>
<td>11</td>
<td>Seconds</td>
<td>67.30 ± 9.90</td>
<td>173.15 ± 36.98</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Note: test paired sample t-test * <0.05 = significant

DISCUSSION

Health for every human being is something important for activities. Fitness, especially from the first day after giving birth can support health, primarily due to pain and fatigue after childbirth (7). Previous research has shown that postpartum mothers are physically active characterized by higher health awareness and can reduce the risk of postpartum depression (8).

The results showed that, the swimming ability of rat given snacks kekerit was longer. On the first day of, the control rats were only able to survive swimming for 68.65 seconds while the rats that received kekerit snacks were able to survive for 101 seconds. This situation shows that these rats are more fit than control rat, because swimming means being able to do activities and of course in a fit condition (9).

The ability to engage in energy needs, kekerit snacks contain 443 calories of energy derived from food in the form of 70% grain. The food is from black sticky rice, peanuts, soybeans, corn which is an energy source. High energy content in this substance can meet the additional food requirements during childbirth and breastfeeding. In the first six months it takes 330 calories of energy, 20 g of protein, 11 g of fat, 45 g of carbohydrate (10). Based on Table.1 Kekerit snacks can meet these needs in 100 grams containing 18.7 grams of protein, 38.4 grams of fat, 5.6 grams of carbohydrates and 443 calories. The content of this nutrient can be an additional source of daily nutrients for nursing mothers. Nursing mothers generally feel hungry faster because at the same time the mother must fulfill her nutritional needs and produce milk. Postpartum mothers often consume kekerit snacks until 40 days postpartum. This high enough energy is good for supporting breastfeeding for babies and preventing supplementary feeding which is usually the reason for mothers not to breastfeed exclusively (11).

The presence of protein in kekerit snacks is beneficial in the postpartum period which functions as improving aerobic performance (endurance), increasing anaerobic capacity to increase strength and energy (12). Also, protein is an essential substance for the structure and function of the body and the recovery of reproductive organs during postpartum (13).

The results of previous studies reported that, herbal medicine Galohgor contained Fe 0.221 mg, and Zinc 0.34 mg. While this study obtained a higher Fe content,
The need for Fe is 26 mg for breastfeeding mothers with an addition of 6 mg. Iron in food is in the form of iron-hem as in hemoglobin and myoglobin animal foods, and iron-them in plant foods. Iron can be absorbed by the body up to 25%, while ironnonhem can be absorbed by the body only 5%. 100% kekerit snack in plant foods, then 0.197 mg is absorbed and if the mother consumes 50 gram kekerit snacks per day, about 31% can be fulfilled from kekerit and can prevent the occurrence of anemia due to Fe deficiency and such cases often occur in postpartum mothers as much as 50-60% (14).

Flavonoids are beneficial for health as an anti-inflammatory, anti-oxidant and antiproliferative and anticancer activity (15). Flavonoid food sources in kekerit snacks come from nuts which are as anti-oxidant (14). In kekerit snacks contain spices such as kencur, ginger, turmeric. Ginger and turmeric contain flavonoids and triterpenoids (Table 2) can be used as a source of antioxidants and treatment of chronic diseases and mineral deficiencies (10). Triterpenoid is a component found in plants that have an odor and can be isolated from plant material which functions to capture free radicals in the human body. One of the ingredients of kekerit is Centella Asiatica which contains triterpenoids which can improve the body’s immune system, which contributes to the fitness of post-partum mothers (16).

CONCLUSION

Kekerit snacks tested at the rat can be beneficial to the health of postpartum mothers, supported from existing content in the form of macro-nutrients, vitamins and minerals, and antioxidants. Further testing needs to be done to humans or postpartum mothers so that the immediate effects and benefits are known that kekerit is a healthy traditional snack.

Ethical Clearance: This research has been carried out and obtained ethical approval from the Health Ministry Polytechnic Research Ethics Commission in Bengkulu (Approval Number: DM.01.04 / 0073 / V / 2016). The authors would like to thank the laboratory of the Faculty of Veterinary Medicine and the laboratory IPB Biochemistry that has helped in the research process. The assistance provided is meaningful for the completion of this study.

Conflict of Interest: The author states that in this study there were no conflicts of interest.

Source of funding: We thank you especially to the Bengkulu Health Ministry of Health Polytechnic Indonesia for financing and supporting this research with the Decree of the Head of the Health Resources Education Center No: HK.02.04 / III.1 / 03234/2016.

Conflict of Interest: Nil.

REFERENCES


Evaluation of Apelin, Periostin and Tartrate-resistant Acid Phosphatase-5B in Ankylosing Spondylitis Male Patients According to their Disease Activity

Israa Abdelmalik Salem¹, Adnan F. Al-Najar¹, Abbas Toma Joda²

¹Department of Chemistry and Biochemistry, College of Medicine, Al-Mustansiriyah University, Baghdad, Iraq, ²Department of Medicine, College of Medicine, Al-Mustansiriyah University, Baghdad, Iraq.

ABSTRACT

Introduction: Apelin is a proinflammatory adipokine that can be induced by other inflammatory mediators. Periostin is produced by different types of tissue under the influence of inflammation and mechanical stress.

Aim: The aim of this study was to evaluate serum (Apelin, Periostin (POSTN), and Tartrate-resistant acid phosphates (TRACP)-5b) among ankylosing spondylitis (AS) male patients with active and inactive disease and find the correlation between disease activity and the studied parameters.

Material and Methods: Fifty-eight male Ankylosing spondylitis (AS) patients were included in this study. Serum Apelin, Periostin (POSTN), and tartrate-resistant acid phosphates (TRACP)-5b were measured using commercial enzyme-linked immunosorbent assay (ELISA) kits. Disease activity was determined by using a BASDAI score.

Results: Ankylosing spondylitis (AS) male patients with active disease had a significantly high serum level of serum TRACP-5b (P-value <0.001) while serum of (Apelin and Periostin) levels shows no significant differences (P-value > 0.05) when to AS males with inactive disease.

Conclusion: The results of this study suggest that serum Apelin and periostin levels show no differences among AS male patients with active when compared to AS male patients with the inactive disease, but serum TRACP-5b was elevated in AS male patients with active disease. Correlations between disease activity (BASDAI score), and serum POSTN and with serum TRACP-5b have been found.

Keywords: Ankylosing spondylitis, Apelin, Periostin, TRACP-5b, and BASDAI.

INTRODUCTION

Ankylosing spondylitis (AS) is a chronic, systemic rheumatic disease with long-term inflammation that affects mostly the joints of axial skeleton (sacroiliac and other joints in the spine (vertebra) and less commonly peripheral joints¹. AS influence the quality of life, the newly formed bones (at vertebral sides) is the main factor to determine the disease’s outcome². Morningstiffness of more than one hour, fatigue and the pain in the lower back at the night and in the morning are the main symptoms of AS³. The pathogenesis of AS consist of a number of different inter-related processes, each of which is controlled by different pathways and factors⁴. There is a combination of genetic and nongenetic factors leads to clinical disease⁵. Ankylosing spondylitis is mostly affecting young people⁶. AS is seen in male more than female, the ratio of 2:1, and the familial occurrence is common³,⁷. The diagnosis of AS before the occurrence of permanent damage is not easy, the diagnosis usually delays between 5 to 10 years from the onset of disease symptoms due to missed diagnose of young men with
inflammatory back pain (IBP) and the radiographic changes in the sacroiliac joints (a late feature of the disease) needed many years to appear by conventional radiology\(^1,8,9\). The diagnosis of AS is made by a mixture of radiological changes, clinical features, and laboratory results, however, classification criteria are available for patient categorization\(^3\). Apelin is a one of adipokines, an endogenous peptide that has the ability to bind to the apelin receptor (APJ or AR) which is also known as an orphan G protein-coupled receptor (GPCR)\(^10\). Apelin can act as pro-inflammatory adipokines, in addition to that other inflammatory mediators such as (TNF-α and IL6) can induce it is an expression\(^11\). It has been found that apelin increases in obesity, cardiovascular disease, cancer\(^12-15\).

Periostin (POSTN) is a 90 KD, secretory matricellular protein consisting of 836 amino acids in human [16]. POSTN is a multi-functional proteinsince it can express by a wide range of human tissue due to mechanical stress or injury\(^17\). It is involved in the bone anabolism via regulation of Wnt-β-catenin signaling. It also plays a major role in the pathogenic mechanisms of syndesmophyte formation in ankylosing spondylitis\(^36\). TRACP-5b is specifically from osteoclast thus TRACP-5b considered as a new, sensitive important biomarker of bone resorption, and data show that it is the only marker reflecting osteoclasts number and metabolic activity of osteoclast\(^18\). Various techniques are available for the measurement of AS. However, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) is a self-administrating tool that composed of six formulated questions, each of which has ten scores that assess fatigue, spinal pain, joint pain, and the duration and the severity of morning stiffness use to determine the activity of the disease\(^19\). With this background, the aim of the present study is to compare serum apelin, periostin, and TRACP-5b levels among AS male patients according to their disease activity (BASDAI Score). Also to find the correlation between disease activity and the studied parameter in the ankylosing spondylitis.

**MATERIALS AND METHOD**

**Patient enrollment**

Fifty-eight male patients with ankylosing spondylitis under the age of 50 were involved in this study. Oral consent was taken before enrolled the patients in the study.

**Blood biochemistry**

The blood samples were taken from both healthy males and AS male patients in fasting condition to determine serum (Apelin, Periostin and TRACP-5b) levels using commercial ELISA Kits and according to the manufacturer’s instructions (the kits were manufactured by My BioSource Inc., USA). Patients with diseases other than AS have been excluded from the study. All patients were subjected to Bath ankylosing spondylitis disease activity index (BASDAI) questionnaire to determine disease activity. Patient with Scores of 4 or greater suggest active disease, and patients with scores below 4 refer to the inactive disease\(^20\).

**Statistical analysis**

Statistical analysis was done using SPSS version 23 computer software.

**RESULTS**

Table 1 represents the variation of apelin, periostin and tartrate-resistant acid phosphatase in active and inactive BASDAI conditions. Statistically non-significant (P=0.51) difference in serum apelin level (Mean±SD) were found in the inactive AS disease (2556.9±439.2pg/ml) as compared to the active AS disease (2488.0±351.6pg/ml). Similar results were obtained with the serum periostin levels. While, a significant increase (P<0.001) in serum TRACP-5b level (Mean±SD) was found in with active disease (7.4±1.9mlU/ml) when compared to the inactive disease (5.5±1.8mlU/ml). Scatter diagram with the fitted regression line showing the linear correlation between disease activity (BASDAI score) and serum periostin among patients with ankylosing spondylitis (AS) is depicted in the Figure 1.
Table 1: The comparison of the studied parameter according to disease activity in ankylosing spondylitis (AS) male patients.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Disease activity</th>
<th></th>
<th></th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inactive (BASDAI score &lt;4) No= 28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apelin (pg/ml)</td>
<td>2556.9 ±439.2</td>
<td>2488 ±351.6</td>
<td>0.51 [NS]</td>
<td></td>
</tr>
<tr>
<td>Periostin (ng/ml)</td>
<td>3.3 ±0.7</td>
<td>3.0 ±0.6</td>
<td>0.06 [NS]</td>
<td></td>
</tr>
<tr>
<td>Tartrate-resistant acid phosphatase (mU/ml)</td>
<td>5.5 ±1.8</td>
<td>7.4 ±1.9</td>
<td>&lt;0.001 [S]</td>
<td></td>
</tr>
</tbody>
</table>

[S]= significant differences between two independent means using student-t-test at 0.05 level. Mean±SD

The Correlation coefficient (r) and significance between the studied parameters in ankylosing spondylitis (AS) male patients and disease activity were depicted in Table 2. There was a significant weak positive correlation between disease activity and serum TRACP-5b (r=0.371, P=0.004) and a significant weak negative correlation between disease activity and serum POSTN (r=-0.34, P=0.009), while no correlation has been found between disease activity and serum Apelin.

Table 2: The Correlation coefficient (r) and the significance between the studied parameters in ankylosing spondylitis (AS) male patients and disease activity.

<table>
<thead>
<tr>
<th>Serum Apelin (pg/ml)</th>
<th>Serum Periostin (ng/ml)</th>
<th>Serum Tartrate resistant acid phosphatase (mU/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disease activity (BASDAI score)</td>
<td>r= -0.03</td>
<td>r= -0.34**</td>
</tr>
<tr>
<td></td>
<td>P=0.82[NS]</td>
<td>P=0.009</td>
</tr>
</tbody>
</table>

[NS] = no significant difference between two independent means using students-t-test at 0.05 level.

Figure 1: Scatter diagram with the fitted regression line showing the linear correlation between disease activity (BASDAI score) and serum periostin (ng/ml) among patients with ankylosing spondylitis (AS).
Figure 2: Scatter diagram with the fitted regression line showing the linear correlation between disease activity (BASDAI score) and serum Tartrate-resistant acid phosphatase (mU/ml) among male with ankylosing spondylitis (AS).

DISCUSSION

Ankylosing spondylitis (AS) is a long-term inflammation of the spine in addition to other joints; it affects men more than women usually in young age and associated with significant alterations in the bone metabolism\(^{21,22}\). Hence, in the present study only male individuals are considered. Apelin, adipokines can promote inflammation in obese person through playing the key role in the communication between the adipose tissue and the immune system but the mechanism is not totally known\(^{23,24}\). The ample amount of literature reported the correlation of apelin with obesity\(^{25-30}\).

Periostin as a molecule is expressed in a wide variety of tissues; it has the ability to act as a structural and signaling molecule\(^{16}\).

This study shows no significant change in serum apelin, and periostin levels but there is a significant increase in TRACP-5b serum level of AS male patients with active disease (Table 1). In addition to that, it shows a positive correlation between disease activity and serum TRACP-5b (\(r = 0.371, p=0.004\)) (Table 2, Figure 1) which agrees with the previous studies\(^{2,31}\). A positively correlated between serum TRACP-5b level and disease activity were reported in previous studies\(^{2,31}\) which inturn indicated the reduction in bone formation and the elevation in bone loss are the manifestations of bone metabolism of AS patients as a result of the inflammatory process\(^{27,28}\). High disease activity associated with an increase and related to bone resorption process in patients with AS\(^{32,33,38}\). While the finding of this study disagrees with Éric et al\(^{34}\) that found no correlation between disease activity and TRACP-5b possibly due to differences in sample size.

This study also shows a negative correlation between disease activity and serum POSTN level (\(r=-0.340, p=0.009\)) (Table 2 and Figure 2). The results are agree with the previous studies\(^{35}\). Solmaz et al\(^{35}\) that suggested the suppression of periostin expression in AS patients occurred with high disease activity and related to the progression of radiological damage. While, another study\(^{36}\) reported lower activity in initial stages which elevated in advanced disease activity, systemic inflammation simultaneously less extensive radiographic damage due to the role of IL-13.

In the present study, serum Apelin level shows no correlation to disease activity (Table 2). Our results are in accordance with previous reports\(^{32,34}\). The accumulation of adipocytes there by increased in apelin occurring under obesity condition can be closely linked with functional ability and structural integraty of lymphatic vessels but no bone structure and function. Apelin signaling leads to enhanced lymphatic and blood vessel integrity\(^{26,35-37}\). However, Hartavi et al\(^{39}\) showed a negative correlation between serum apelin and disease activity. Is worth to mention that the association between the activity of the disease and bone turnover markers has not been fully studied\(^{35}\).
CONCLUSION

In the present study, no correlation has been found between serum apelin and disease activity. A weak negative correlation was found between disease activity and serum POSTN. A weak positive correlation was found between disease activity and serum TRACP-5b.

Ethical Clearance: The ethical clearance was taken from College of Medicine, Al-Mustansiriyah University, Baghdad, Iraq. Oral consent was taken before enrolled the patients in the study.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


Sleep Disturbances and Self-Management among Adolescents with Nocturnal Asthma in Al- Najaf City

Doaa Ghaleb Hadi Al- Abayechi¹, Fatima Wanas Khudair², Arafat Hussain AL-Dujaili³

¹Department of Pediatric Nursing, Faculty of Nursing, University of Kufa, Iraq, ²Assistant Prof. Faculty of Nursing, University of Kufa, Iraq, ³Asst. Prof. Dr. Arafat Hussain AL-Dujaili, University of Kufa, Iraq

ABSTRACT

Self-management improves quality of life among adolescents with nocturnal asthma. This study aimed to identify sleep disturbances and self-managements regarding asthmatic attack among adolescents with nocturnal asthma. Therefore, a cross sectional study was conducted at the Emergency Department in Al-Najaf, during the period October 15th 2017 to September 18th 2018. The study included 100 adolescents with nocturnal asthma who met the inclusion criteria, a pre-structured validated questionnaire was used, including demographic information, sleep disturbances variables and self-managements questionnaire. Data were managed and analyzed using the statistical package for social sciences software version 25 and appropriate statistical tests were applied accordingly. The findings revealed that (66.6%) of patients had moderate and (30%) had severe sleep disturbances. Also, (77.7%) of patients had a poor and (22.2%) had fair self-management. It had been significantly found that females were less aware for self-management, (P<0.05), other characteristics showed no significant association, (P>0.05). In conclusion, an evidence of sleep disturbances among the adolescents that result from asthmatic attack during the night. Deficit knowledge regarding self-management of asthmatic attack and other female gender can contributed to such attacks.

Keywords: Nocturnal asthma, Sleep disturbances, Self-management .

INTRODUCTION

Asthma is a chronic inflammatory disease complex that occurs in the airways(bronchi) in the lungs. Being widespread globally, asthma kills one person in every 250 deaths in the world ¹. According to the World Health Organization(WHO) estimate in 2005 it affects around 300 million people worldwide. Asthma is among the highest twenty chronic conditions for global ranking of disability-adjusted life years in adolescents. Death rates from asthma in children globally range from 1% to 7% of 100 000. The prevalence of asthma has increased in developing countries over the last 30 years but now appears to have stabilized, with about 10–12% of adults, 12-14% of adolescents and 15% of children affected by the disease. In developing countries the prevalence of asthma had been much lower ².

Corresponding author:

Doaa Ghaleb Hadi Al- Abayechi

E-mail: alabayechi@yahoo.com

Asthma is characterized by recurrent attacks of breathlessness and obstruction of airflow causes frequent occurrence of wheezing, shortness of breathing, chest tightness, and cough especially nighttime, or early morning which vary in severity and frequency from person to person. These episodes are usually associated with variable airflow obstruction that is often reversible, either spontaneously or with treatment ³. Nocturnal asthma usually worsens at night, the systems representing this nocturnal worsening of symptoms are not totally seen but rather might be driven by circadian rhythms of circulating hormones (epinephrine, cortisol, and melatonin and neural instruments). An increase in airway inflammation at night has been reported. This finding may reflect a reduction in endogenous anti inflammatory mechanism ⁴,⁵. It has also been shown that adolescents are more prone to shorter sleep duration and poor sleep habits. Focusing on adolescent youth is critical as many health-related behavioral patterns that are formed during adolescence continue in adulthood and affect adult health outcomes⁶.
Adolescent sleep is important because it might be both a cause and the result of health problems. However, it still remains a neglected topic in adolescent health research, partly because there are widespread misunderstandings about adolescents’ needs for sleep. In fact, the sleep needs of teenagers are not very dissimilar to those of primary school aged children. They remain higher than adult needs across the second decade of life; probably because sleep plays a big part in creating the environment for healthy brain development, adolescent brains are still changing and refining across this age period.

**Patients and Method**

This was a cross-sectional study carried out in Al-Najaf city-Iraq at the Center for Allergy and Asthma in Al-Sadr teaching hospital, and the emergency department of Al-Hakim and Al-Zahra teaching hospitals during the period 15th October 2017 to 18th September 2018. Included 100 adolescents with nocturnal asthma.

*Study Instrument included* the following parts:

- Part I: Patients’ Demographic Data and Clinical Data
- Part II: Patients’ Sleep disturbances in asthmatic adolescent scale
- Part III: Asthma self-management questionnaire

Data were collected through a structured interview technique with the subjects and the statistical analysis performed using the statistical package for social sciences and appropriate statistical tests and procedures applied accordingly with level of significance of < 0.05.

**FINDINGS**

Sleep disturbances were mild in 4%, moderate in 66% and severe in 30% of the studied group, (Table 1). Responses of the study participants towards Self-management items were poor in most of these items giving poor overall self-management evaluation, (Table 2). No statistically significant association had been found between self-management and sleep disturbances from one side and demographic characteristics of the studied group from the other side except one correlation was significant which was between female gender and poor Self-Management, (P<0.05), (Table 3), furthermore, females had significantly lower mean score of self-management, 3.91 ± 1.97 compared to males (mean score: 4.94 ± 2.41), (P<0.05), (Table 4)

**Table 1. Distribution of sleep disturbances among the studied group**

<table>
<thead>
<tr>
<th>Sleep disturbance</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>4</td>
<td>4.00</td>
</tr>
<tr>
<td>Moderate</td>
<td>66</td>
<td>66.0</td>
</tr>
<tr>
<td>Severe</td>
<td>30</td>
<td>30.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Table 2: Responses and evaluation of the study participants toward the self-management questionnaire items (N = 100).**

<table>
<thead>
<tr>
<th>Item</th>
<th>Response</th>
<th>Mean score</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preferred</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unpreferred</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>Methods of prevent asthma</td>
<td>0</td>
<td>0.0</td>
<td>100</td>
</tr>
<tr>
<td>Taking a prescribed two puffs</td>
<td>39</td>
<td>39.0</td>
<td>61</td>
</tr>
<tr>
<td>Not having asthma symptoms</td>
<td>63</td>
<td>63.0</td>
<td>37</td>
</tr>
<tr>
<td>Maintenance medicines</td>
<td>19</td>
<td>19.0</td>
<td>81</td>
</tr>
<tr>
<td>Correct way to use peak flow</td>
<td>29</td>
<td>29.0</td>
<td>71</td>
</tr>
<tr>
<td>Rescue medicines</td>
<td>8</td>
<td>8.0</td>
<td>92</td>
</tr>
<tr>
<td>What using your inhaler</td>
<td>4</td>
<td>4.0</td>
<td>96</td>
</tr>
<tr>
<td>After using inhaler</td>
<td>56</td>
<td>56.0</td>
<td>44</td>
</tr>
</tbody>
</table>
Continuation... Table 2: Responses and evaluation of the study participants toward the self-management questionnaire items (N = 100).

<table>
<thead>
<tr>
<th>Having a symptoms</th>
<th>27</th>
<th>27.0</th>
<th>73</th>
<th>73.0</th>
<th>0.27</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taking more medicine than prescribed</td>
<td>23</td>
<td>23.0</td>
<td>77</td>
<td>77.0</td>
<td>0.23</td>
<td>Poor</td>
</tr>
<tr>
<td>Benefits of using peak flow meter</td>
<td>2</td>
<td>2.0</td>
<td>98</td>
<td>98.0</td>
<td>0.02</td>
<td>Poor</td>
</tr>
<tr>
<td>Exercises</td>
<td>21</td>
<td>21.0</td>
<td>79</td>
<td>79.0</td>
<td>0.21</td>
<td>Poor</td>
</tr>
<tr>
<td>Asthma can be cured by</td>
<td>13</td>
<td>13.0</td>
<td>87</td>
<td>87.0</td>
<td>0.13</td>
<td>Poor</td>
</tr>
<tr>
<td>Asthma flare-ups</td>
<td>34</td>
<td>34.0</td>
<td>66</td>
<td>66.0</td>
<td>0.34</td>
<td>Fair</td>
</tr>
<tr>
<td>Course of steroids</td>
<td>64</td>
<td>64.0</td>
<td>36</td>
<td>36.0</td>
<td>0.64</td>
<td>Fair</td>
</tr>
<tr>
<td>Control asthma</td>
<td>44</td>
<td>44.0</td>
<td>56</td>
<td>56.0</td>
<td>0.44</td>
<td>Fair</td>
</tr>
<tr>
<td>Overall score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.28</td>
<td>Poor</td>
</tr>
</tbody>
</table>

Table 3. Correlation coefficient and P. value for self-management and sleep disturbances.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Self-Management</th>
<th>Sleep disturbances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation coefficient</td>
<td>P. value</td>
</tr>
<tr>
<td>AGE</td>
<td>0.02</td>
<td>0.88</td>
</tr>
<tr>
<td>BMI</td>
<td>-0.08</td>
<td>0.41</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>-0.228</td>
<td>0.023</td>
</tr>
<tr>
<td>Residence</td>
<td>-0.19</td>
<td>0.06</td>
</tr>
<tr>
<td>Order in the family</td>
<td>0.08</td>
<td>0.42</td>
</tr>
<tr>
<td>Education</td>
<td>-0.19</td>
<td>0.06</td>
</tr>
<tr>
<td>Mother job</td>
<td>0.02</td>
<td>0.83</td>
</tr>
<tr>
<td>Father job</td>
<td>-0.07</td>
<td>0.48</td>
</tr>
<tr>
<td>Alone room</td>
<td>0.02</td>
<td>0.88</td>
</tr>
<tr>
<td>Income</td>
<td>0.11</td>
<td>0.28</td>
</tr>
<tr>
<td>Smoking</td>
<td>-0.15</td>
<td>0.15</td>
</tr>
<tr>
<td>Medications</td>
<td>-0.15</td>
<td>0.12</td>
</tr>
<tr>
<td>Allergy</td>
<td>-0.11</td>
<td>0.28</td>
</tr>
<tr>
<td>Type of Allergy</td>
<td>-0.03</td>
<td>0.75</td>
</tr>
</tbody>
</table>

Table 4. Comparison of mean scores of self-management of both genders.

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Total score for self-management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Male</td>
<td>53</td>
<td>4.94</td>
</tr>
<tr>
<td>Female</td>
<td>47</td>
<td>3.91</td>
</tr>
</tbody>
</table>

\[ t-test = 2.318, \text{ P. value } = 0.023 \]

**DISCUSSION**

Adolescents have suffer from moderate sleep disturbances of nocturnal asthma. Adolescents have difficulty sleeping on a daily almost, the highest rate (66%), this is due to asthmatic attack lead to sleep disturbances during night, this study agrees with the study conducted by Levin et al. Overall, patients responses to the items of asthma self-management questionnaire
ASMQ revealed wide gaps in knowledge of asthmatic patients about the disease, the role of different medication and method of prevention of asthma attack and 77% of adolescents have poor self-management about asthmatic attack during night time such as the recruited adolescents had poor knowledge of the technique of using the inhaler with regard to the steps taken during the use of the device. Where linked the improper use of inhaler among asthmatic patients with poor control of the disease with a lack of health education and irregularity of follow up visits as significant predictors of improper use 9,10.

In this study asthmatic patients were correlation sleep disturbance and self-management in gender that the male more knowledge than female (53%), the low level of knowledge about the most important items that help the patient to self-manage asthma can be attributed to the absence of formal health education 11.

CONCLUSION

Based on the study results the study, there was an evidence of sleep disturbances among the adolescents due to asthmatic attack during the night. Deficit knowledge regarding self-management of asthmatic attack, gender, residency, and levels of education could play a role in these attacks. The intensity of sleep disturbance at night could contributed to difficult sleep, drowsiness during the day, and early morning awakening. There were very wide gaps in the adolescent’s knowledge of the most essential items about the disease, medications and preventive measures and how to use the inhaler that decreases asthma exacerbations. Therefore, it is recommended to create voluntary courses to raise awareness among adolescents and educate parents in cooperation with specialized medical staff. An educational programs targeting asthmatic adolescents and parents could improve self-management and commitment to self-care as an important part of reducing the risk of asthma and morbidity, using standard health care guidelines, and get benefit of the social media, posters educational publications to educate about self-management and risk factors that increase attacks of asthma.

Ethical Permission: The study protocol was approved by the council of the college of nursing, university of Kufa and the ethical committee of researches. Verbal informed consents were obtained from all participants and their parents. Data were collected according to the World Medical Association Declaration of Helsinki 2013

Conflict of Interest: None.

Source of Funding: Self-Funded.

REFERENCES

5. Carr TF, Kraft M. Management of severe asthma before referral to the severe asthma specialist. The Journal of Allergy and Clinical Immunology: In Practice. 2017 Jul 1;5(4):877-86.
asthma control and frequent emergency department visits. Allergy, Asthma & Clinical Immunology. 2013 Dec;9 (1): 8-12.


Factors Associated with the Occurrence of Anemia in Pregnant Women in the Work Area of Baraka Public Health Center, Enrekang District, South Sulawesi Indonesia

Kalma
Health Polytechnic of Ministry of Health in Makassar, Indonesia

ABSTRACT
Study of factors related to anemia in pregnant women in the work areas of Baraka Public Health Facility of Enrekang District aimed to know the parity, mother’s age, and inter-pregnancy interval with anemia in pregnant women was conducted. The method used in this study is a laboratory observation method with a descriptive approach, where each respondent was examined for hemoglobin (Hb) levels as a dependent variable and data about independent variables. The study was conducted from June to October 2017. The results showed that the parity factor and age of pregnant women had a relationship with the incidence of anemia, where the p-value < α (0.05), the distance of pregnancy did not have a significant relationship with the incidence of anemia, where the value of p > α (0.05). From the results of the study concluded that the age of pregnant women is the most influential factor in the incidence of anemia in pregnant women in Baraka Public Health Center, Enrekang District.

Keywords: age, anemia, Baraka, inter-pregnancy interval, parity, pregnant women

INTRODUCTION
Public health development in Indonesia is mainly aiming to increase life expectancy, improve the quality of life of human resources, and improve the quality of life in order to improve family welfare so that it can deliver optimal levels of public health. Health is one of the basic human needs, so it needs to endeavor so that every citizen is increasingly aware of the importance of health for himself and his environment, and can increasingly behave good healthy life.

Undernutrition is one of the main problems of public health in Indonesia. Especially in poor population. Nutrition problem, especially in pregnant women, is a big problem because it is a supporting factor for anemia in pregnant women. Anemia during pregnancy is a significant health problem in order to improve public health. Regarding maternal and child health, anemia is a major nutritional problem in developing countries including Indonesia.

Anemia is one of the factors that become an indicator of the success of a nation’s health development that describes socio-economic capabilities in meeting the needs of quality and quantity of people’s nutrition.

Anemia during pregnancy is a significant health problem to improve the degree of public health related to public health. Regarding maternal and child health, anemia is a major nutritional problem in developing countries, including Indonesia.

Data from the World Health Organization (WHO) in 2010 showed that anemia in pregnant women ranged from 20-85% with hemoglobin levels (Hb ≤ 11 g/dL). In developing countries including Indonesia, the infant mortality rate and the percentage of anemia during pregnancy are the most sensitive indicators to describe health status, especially maternal health in infants. The Indonesian Health Demographic Survey (SKDI) in 2012 showed that maternal mortality (MMR) in Indonesia was 228/100,000 live births. The causes of maternal...
deaths due to bleeding were 29.67%, infections 5.51%, abortion 1.77%, prolonged labor 1.65%, and others 34.35%. Maternal mortality is one indicator of the success of health services in a country. The direct cause of maternal death is bleeding, eclampsia and indirect causes are anemia (4).

Pregnancy is a natural process and not a pathological process. Pregnancy usually develops and results in the birth of a term healthy baby through the birth canal, but this is not always as expected, normal conditions can be pathological/abnormal. From the medical record data of Baraka Health Center in 2015 showed the number of pregnant women who had their pregnancies examined in 2015 as many as 196 people with some cases of anemia as many as 72 pregnant women. Nowadays, researchers interested to do research to determine factors related to the incidence of anemia in pregnant women in the working area of Baraka District Enrekang Health Center. The factors studied included: parity, age, and inter-pregnancy interval (2).

Anemia is a decrease in the number of red blood cells or the concentration of hemoglobin in the blood circulation. Causes of anemia include malnutrition, lack of iron, malabsorption, massive blood loss such as labor, abnormal menstruation, chronic infectious diseases such as pulmonary tuberculosis, intestinal worms, malaria, and others. According to World Health Organization, anemia in pregnant women is classified based on Hb levels of pregnant women into three categories as follows: normal (Hb ≥ 11 g/dL), mild anemia (Hb 8-10 g/dL), and severe anemia severe (Hb <8.0 g/dL) (10).

MATERIAL AND METHOD

The type of research used in this study was observational with a descriptive cross-sectional study approach. Pregnant women who examined themselves at the Baraka Public Health Center in Enrekang District included in this study were examined their hemoglobin (Hb) levels. Data on dependent and independent variables are collected simultaneously, to obtain information about the relationship of several factors to the incidence of anemia in pregnant women in the working area of the Baraka Public Health Center in Enrekang District.

This study was carried out from June to October 2017. The populations in this study were pregnant women who were in the working area of the Baraka Health Center in Enrekang Regency who came to have their pregnancies examined during the study period. The samples in this study were pregnant women who had their pregnancies examined at Baraka Health Center in Enrekang Regency. The sample size in this study was 65 people. The sampling technique in this study is the total sampling technique.

The independent variables in this study were factors related to the incidence of anemia in pregnant women: parity, the age of pregnant women, and inter-pregnancy interval. The dependent variable in this study was anemia in pregnant women.

The data obtained in this study include primary data, namely hemoglobin levels examined directly in pregnant women with the Sahli method. Also, other primary data obtained in this research is filling in questionnaires distributed to pregnant women to identify data relating to knowledge, education, age, parity, and inter-pregnancy interval. Other than that, secondary data also obtained including a profile of the Department of Health of Enrekang District and the medical record of the patients from Baraka Public Health Center in Enrekang District.

Materials and tools used in this study are 3 mL syringe, tourniquet, cotton, lancet, a reaction tube, 20 µl micropipette, Sahli hemometer, alcohol 70%, and HCl 0.1 N solution.

DATA ANALYSIS

The analysis used in this study is regression analysis which aims to determine the relationship of each independent variable to the dependent variable. Regression analysis also used to know which variable, from the three independent variables, is the most dominant relationship with the incidence of anemia in pregnant women.

FINDING

Hemoglobin level of pregnant women in the working area of Baraka Public Health Center displayed in Table 1. Twenty-six of respondents (40%) suffered from anemia based on their hemoglobin level while the other 39 pregnant women (60%) not. Table 2 displayed that as much as 84.6 % (55 pregnant women) are low-risk parity while 15.4 others are high-risk parity.
Table 1 Distribution of Respondents Based on Occurrence of Anemia in Pregnant Women in Baraka Health Center in Enrekang District in 2017

<table>
<thead>
<tr>
<th>Hemoglobin level</th>
<th>(n)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemia</td>
<td>26</td>
<td>40</td>
</tr>
<tr>
<td>Normal</td>
<td>39</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Primary Data 2017

Table 2 Distribution of pregnant women who examined their pregnancies according to parity at the Baraka Public Health Center in Enrekang District in 2017

<table>
<thead>
<tr>
<th>Parity</th>
<th>(n)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Risk</td>
<td>10</td>
<td>15.4</td>
</tr>
<tr>
<td>Low Risk</td>
<td>55</td>
<td>84.6</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Primary Data 2017

Table 3 Distribution of pregnant women who check their pregnancies according to the age of pregnant women at the Baraka Health Center in Enrekang Regency in 2017

<table>
<thead>
<tr>
<th>Age</th>
<th>(n)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Risk</td>
<td>11</td>
<td>16.9</td>
</tr>
<tr>
<td>Low Risk</td>
<td>54</td>
<td>83.1</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Primary Data 2017

Based on the age, it is shown in Table 3 that 11 of respondents (16.9%) are high risk, while the majority of them (83.1% or 54 people) are low risk. It is displayed in Table 4 that all (100%) of women included in this study were at low risk based on the inter-pregnancy interval.

Table 4 Distribution of pregnant women who check their pregnancies according to the inter-pregnancy interval at the Baraka Public Health Center, Enrekang District in 2017

<table>
<thead>
<tr>
<th>Inter-pregnancy interval</th>
<th>(n)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Risk</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Low Risk</td>
<td>65</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Primary Data 2017

**DISCUSSION**

Anemia in pregnancy is a condition where the hemoglobin (Hb) level is lower than the standard value which is less than 11.0 g/dL. Pregnant women whose hemoglobin levels 8.1-10 g/dL, 6.5-8 g/dL, and < 6.5 g/dL were classified as suffering mild, moderate, and severe anemia, respectively (Tabrizi and Barjasteh
Anemia in Indonesia is still considered a public health problem since its high prevalence, especially for pregnant women. Anemia in adults can cause fatigue and weakness which resulting in lowering productivity and the declining of work capacity[3].

Anemia can be caused by malnutrition, lack of iron, malabsorption, massive blood loss (such as labor and abnormal menstruation), and chronic infectious diseases (including pulmonary tuberculosis, intestinal worms, malaria, and others)[6][7].

Parity is the number of deliveries performed or experienced by a woman with live births or stillbirths. The number of births can affect the body’s metabolic process. The present data of prevalence of anemia in pregnant women (40%) was higher compared to national health survey conducted by Ministry of Health[5].

The analysis using chi-squared with a 0.05 showed that there is strong association between parity and the incidence of anemia among pregnant women in Baraka Public Health Center of Enrekang District (p-value = 0.000). The result means that high risk parity (or pregnancy more than 3 times) has a higher chance of anemia compared to low risk parity. High risk parity in pregnant women usually relates to the level of knowledge that the mother lacks in the impact of the number of pregnancies. There is still lack of dissemination of information through counseling about the normal number of pregnancies by every woman.

Age is one factor that cannot be changed. Epidemiological attention is made to certain age groups because it has its own important problems. Age grouping is usually based on the presence of a problem and is specifically associated with other health factors. The age referred to in this study is the age of pregnant women with high risk i.e. less than 20 years and more than 35 years. Mother’s age is very influential on the development of reproductive organs. This relates to the physiological state of the mother’s body in accepting presence and supporting the development of the fetus. A woman entering the age of marriage will experience a certain phase in her life where healthy reproductive age is between 20-35 years. There was a significant relationship (p value= 0.000) between the age of pregnant women with the incidence of anemia among pregnant women in Baraka Public Health Center of Enrekang District based on chi-squared test.

Inter-pregnancy interval is the interval between two consecutive births of a woman. Setting the interval between pregnancies has an impact on the health of the mother and her baby, the inter-pregnancy interval that is too tight (<2 years) is more risky than the longer inter-pregnancy interval (> 2 years). This is because the anatomy of a woman needs time to restore her health and adequate nutritional intake. Based on this research, there is no association between interpregnancy interval and the incidence of anemia in pregnant women in Baraka Public Health Center of Enrekang District based on chi-square test (p-value = 0.40).

CONCLUSION
1. there is a significant association between parity and the incidence of anemia in pregnant women in Baraka Public Health Center of Enrekang District
2. there is significant association between the age of pregnant women and the incidence of anemia in pregnant women in Baraka Public Health Center of Enrekang District
3. there is no association between the inter-pregnancy interval with the incidence of anemia in pregnant women in Baraka Public Health Center of Enrekang District
4. the age of pregnant women is the most factor that associated with anemia in pregnant women in Baraka Public Health Center of Enrekang District.

Conflict-of-Interest Statement: In this study between researchers and research, subjects did not have a conflict of interest, because subjects did not have personal or informal relationships with researchers.

Source of Funding: The source of funds in this study came from the Research of Health Workforce Development of the Ministry of Health of the Republic of Indonesia.

Ethical Clearance: The ethics of this study were obtained from the Ethics Commission for Health Research, Poltekkes Kemenkes Makassar.

REFERENCES


Effect Minimum Inhibitory Concentration and Minimum Bactericidal Concentration of Honey Bee *Trigona spp* on *Streptococcus pyogenes*

Ratih Dewi Dwiyanti¹, Yulia Tri Andini², Leka Lutpiatina³

¹Medical Laboratory Technology Poltekkes Kemenkes Banjarmasin, Mistar Cokrokusumo Street 4a Banjarbaru Indonesia, ²Medical Laboratory Technology Poltekkes Kemenkes Banjarmasin, Mistar Cokrokusumo Street 4a Banjarbaru Indonesia, ³Medical Laboratory Technology Poltekkes Kemenkes Banjarmasin, Mistar Cokrokusumo Street 4a Banjarbaru Indonesia

**ABSTRACT**

*Streptococcus pyogenes* one cause of respiratory tract infections including pharyngitis. Seventy-three percent of doctors prescribe antibiotics for pharyngitis. In developing countries, antibiotics are prescribed for 44-97% of hospitalized patients, sometimes with inappropriate doses. Improper antibiotic use can cause side effects such as allergies or diarrhea, increase health care costs, and increase the possibility of selection for antibiotic resistance. Research needs to be done on natural antibiotics found in natural ingredients. One of the natural ingredients empirically has many properties and is relatively safe is honey from bees. Honey has substances that are bactericidal and bacteriostatic like antibiotics. This study aimed Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) honey bee *Trigona spp* against *Streptococcus pyogenes* in vitro. In concentration of 2.5%, 5%, 7.5%, 10%, and 12.5% and knowing the effect of honey bee *Trigona spp* with a concentration of 2.5%, 5%, 7.5%, 10%, and 12.5% against *Streptococcus pyogenes* in vitro. Type of research is the experiment with the Posttest-Only Control Group Design, the research material of honey from *Trigona spp* independent variable is the concentration of honeybees *Trigona spp*. The dependent variable is the level of turbidity produced in a tube to measure MIC and the number of colonies *Streptococcus pyogenes* on Blood Agar Plate media to measure MBC. The results of the MIC determination showed that all concentrations showed clear, MBC results the largest number of colonies occurred at a concentration of 2.5% of the total colony colonies and colonies growth the smallest occurred at a concentration of 10% of the number of colonies 0 colonies, Conclusions of MIC cone honey bee *Trigona spp* against bacteria *Streptococcus pyogenes* occurred at a concentration of 2.5%, MBC moth honey *Trigona spp* against bacteria *Streptococcus pyogenes* occurred at a concentration of 10%. There is an influence of the honey *Trigona spp* on the bacteria *Streptococcus pyogenes*, which is indicated by the value of p <0.05, which is 0,000 using the Linear Regression test.

**Keywords:** MIC, MBC, *Streptococcus pyogenes*.

**INTRODUCTION**

*Streptococcus pyogenes* (Streptococcus group A) is one of the causes of respiratory tract infections including pharyngitis. In Indonesia every year ± 40 million people visit health care centers because of pharyngitis¹. In the United States, 15−30% of cases of pharyngitis are in school-age children and 5-15% of cases of pharyngitis in adults. Usually occurs in the winter, which is a result of infection with Streptococcus, hemolytic, group pharyngitis is rare in children less than three years².

Seventy-three percent of doctors prescribe antibiotics for pharyngitis, most of which are caused by bacteria. In developing countries, antibiotics are prescribed for 44-97% of hospitalized patients, sometimes with inappropriate doses. Incorrect antibiotic use (indications, selection, length of administration, and improper doses) can cause side effects such as allergies or diarrhea, increase health care costs, and increase the likelihood of selection for antibiotic resistance³. Antibiotic resistance in Indonesia has been found, such as staphylococcus...
aureus which is resistant to methicilin and vancomycin.

Indonesia is rich in natural ingredients that can be used as an antibacterial, anti-fungal or anti-larvae. As Anredera cordifolia, lime for antibacterial, Cananga odorata for anti-larvae and Kaempferia galanga as antifungal. Another natural material that is widely used is honey. Bee honey empirically has many properties and is relatively safe, Research Wineri et al. (2013) proved that honey has an active effect against and inhibits pathogenic bacteria that cause infection, such as Streptococcus pyogenes which can cause pharyngitis. Honey has substances that are bactericidal and bacteriostatic like antibiotics. Bacteria cannot live and develop in honey because honey has antibiotic substances such as anti-viral interferon, and inhibit which can inhibit bacterial growth.

MATERIALS AND METHOD

This type of research is the experiment the form of a Posttest-Only Control Group Design.

The research was carried out at the Bacteriology Laboratory of the Health Analyst Department of the Health Ministry of Health Banjarmasin January 2018. The research material was honey from the honeycomb (Trigona spp).

The independent variable was the concentration of honeybees Trigona spp. The dependent variable is the level of turbidity produced in the tube to see MIC and the number of colonies Streptococcus pyogenes on BAP (Blood Agar Plate) media to see MIC.

Research steps include bee determination at the Entomology Laboratory of the Faculty of Biology, Gadjah Mada University, Yogyakarta. The sampling of honey bee honey and sterility testing. Making suspension of bacteria. Streptococcus pyogenes Making a series of bee honey concentration in each sterile test tube as in the following table:

<table>
<thead>
<tr>
<th>Sterile Tube</th>
<th>Concentration of Honey (ml)</th>
<th>Aquades Solution (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5% 0.25 ml</td>
<td>4.75 ml</td>
</tr>
<tr>
<td>2</td>
<td>10% 0.50 ml</td>
<td>4.50 ml</td>
</tr>
<tr>
<td>3</td>
<td>15% 0.75 ml</td>
<td>4.25 ml</td>
</tr>
<tr>
<td>4</td>
<td>20% 1.00 ml</td>
<td>4.00 ml</td>
</tr>
<tr>
<td>5</td>
<td>25% 1.25 ml</td>
<td>3.75 ml</td>
</tr>
</tbody>
</table>

Treatment of Research: Determination of MIC :: Preparing a sterile test tube and labeled according to variations in the concentration made of 2.5%, 5%, 7.5%, 10%, 12.5%, PC (positive control), NC (negative control) and HC (honey control). From each concentration, 1ml was taken and added 1 ml of bacterial suspense. The positive control tube filled with 1 ml of 5 µg of Levofoxacin antibiotics and 1 ml of bacterial suspension. The negative control tube was filled with 1 ml of sterile TSB and added with 1 ml of bacterial suspension. The honey control tube was filled with 1 ml of bee honey plus 1 ml of sterile TSB. Mix well and incubated for 24 hours at 37°C in the incubator. The results were read by finding a tube containing the lowest honey content but still being able to inhibit bacteria (clear solution) which was declared as MIC. After obtaining the results of Minimum inhibitory concentration, the examination continued with the determination of MIC.

Determination of MIC: The tube that was determined for 24 hours at 35°C in an incubator. Read the results by counting the number of colonies growing on the surface of the media using the colony counter and then looking for concentrations that do not show bacterial growth at all. Five repetitions.
RESULTS AND DISCUSSION

Table 2: Results of Minimum Inhibitory Concentration (MIC)

<table>
<thead>
<tr>
<th>Level of clarity of repetition of</th>
<th>Concentration of honey beetle</th>
<th>Control</th>
<th>2.5%</th>
<th>5%</th>
<th>7.5%</th>
<th>10%</th>
<th>12.5%</th>
<th>Negative (KN)</th>
<th>Positive (KP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Cloudy</td>
<td>Clear</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Cloudy</td>
<td>Clear</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Cloudy</td>
<td>Clear</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Cloudy</td>
<td>Clear</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Cloudy</td>
<td>Clear</td>
<td></td>
</tr>
<tr>
<td>average</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Cloudy</td>
<td>Clear</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Results of Minimum Bactericidal Concentration (MBC)

<table>
<thead>
<tr>
<th>Clarity level of repetition of</th>
<th>Concentration of honey beetle</th>
<th>Control</th>
<th>2.5%</th>
<th>5%</th>
<th>7.5%</th>
<th>10%</th>
<th>12.5%</th>
<th>Negative (KN)</th>
<th>Positive (KP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4416</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>35</td>
<td>25</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3888</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>31</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4304</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>31</td>
<td>14</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4112</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>38</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3984</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>35</td>
<td>15</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4141</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

The average number of colonies *Streptococcus pyogenes* for each concentration in determining the minimum Bactericidal concentration is presented as in Figure 1.1.
Based on the results of normality data testing using Shapiro-Wilk, it is known the asymp value. Sig = 0.365; 0.408; 0.223; 0.782. Asymp value. Sig> 0.05, it can be stated that MIC data is normally distributed.

### Table. 4 Normality Test Results for the Number of colonies *Streptococcus pyogenes* on Determination of Minimum Bactericidal Concentration (MBC)

<table>
<thead>
<tr>
<th>Minimum Bactericidal Concentration</th>
<th>Kolmogorov-Smirnov*</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistics</td>
<td>Df</td>
</tr>
<tr>
<td>Number of Colonies <em>Streptococcus pyogenes</em></td>
<td>2.5%</td>
<td>.238</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>.225</td>
</tr>
<tr>
<td></td>
<td>10%</td>
<td>.261</td>
</tr>
<tr>
<td>KN.</td>
<td>172</td>
<td>5</td>
</tr>
</tbody>
</table>

The test continued with the ANOVA test to assess the quality of the regression equation obtained. Based on the ANOVA test results obtained a significant value of 0.000 so that the equation obtained is not used.

Regression test results obtained a significance value of 0.000. The value of significance <α = 0.05 can be stated treatment of different concentrations of honey bees effect on the growth of *Streptococcus pyogenes* in vitro.

The results of the determination coefficient test, the R square value is 0.420. This value is to conclude that the effect of bee honey on the growth of *Streptococcus pyogenes* is 42% (obtained from 0.420 x 100%), which means that honey bee has a weak influence on the growth of *Streptococcus pyogenes*.

The results showed that the higher the level of concentration of honey bee honey added, the greater the ability of inhibitory power and killing power on the growth of *Streptococcus pyogenes*. This is characterized by the occurrence of clarity in TSB media tube dilution test (table 2) and a decrease in the number of colonies *Streptococcus pyogenes* that grow on the surface of the nutrient agar media (table 3). Based on the results of the regression test obtained a significance value <α = 0.05, it can be stated that the treatment of different concentrations of bee honey affects the growth of *Streptococcus pyogenes*.

Based on Erywiyatno’s (2014) research on the minimum concentration of honey which can inhibit the growth of Group A beta-hemolytic *Streptococcus* by diluting honey at concentrations of 10%, 20%, 40%, 60%, 80%, and 100%, it shows that the minimum inhibitory concentration (MIC) on packaged honey against the growth of Group A beta *Streptococcus hemolyticus* is positive (+) at a concentration of 90% and Minimum Bactericidal Concentration (MBC) is at a concentration of 95%.

According to Wineri (2013) based on the origin of manufacture, honey is divided into natural honey and packaged honey. Physically packaged honey has similarities with natural honey, but there are differences in nutritional content. Natural honey has high sugar content in the form of fructose 38.19%, glucose 31%, and sucrose 1.31%. The sugar content found in natural honey causes the viscosity of natural honey to be thicker compared to packaged honey, this is due to the process of making packaged honey there is a stage of giving water and other mixtures so that the volume of honey packs becomes more. Also, packaged honey does not contain enzymes, vitamins, and minerals as found in natural honey. Therefore, the results of the study of Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) in the honey bee honey (*Trigona spp*) occur at low concentrations compared to the results of Erywiyatno’s research using packaged honey.

Honey has substances that are bactericidal and
bacteriostatic like antibiotics. Bacteria cannot live and develop in honey because honey contains an element of potassium which is an element that prevents moisture so that it can inhibit bacterial growth. Based on the results of research it has been known that honey has the broad spectrum antibiotic activity to fight pathogenic bacteria. Honey also contains phenol, peroxide and non-peroxide components, has a thick viscosity, and a low pH that can inhibit bacterial growth. The hygroscopic properties of honey can attract water from the living environment of bacteria which results in dehydrated bacteria. Honey is also an immunomodulator by triggering macrophages to produce cytokines involved in killing bacteria and repairing tissues. These antibacterial properties are effective in inhibiting the growth of Salmonella typhi, Escherichia coli, Enterobacter aerogenes, Staphylococcus aureus and Pseudomonas aeruginosa.

Non-sting honey bee Trigona spp has been shown to contain high phenolic levels. Phenolic benefits for health include functioning as antioxidants, antibacterial and anti-inflammatory. The research examined the phenolic content in honey produced by Apismellifera, A. dorsata, A. cerana, and two types of Trigona sp. The results showed that the phenolic content of honey was Trigona superior to honey from the genus Apis bee. The values of the phenolic content of honey studied were 602.4 mg EAG (Galatea Acid Equivalent) per kg of honey; 589.2 mg; 510.4 mg; 791.5 mg; and 1,058.8 mg.

The mechanism of action of phenol compounds in killing bacterial cells is three ways, namely denaturing bacterial cell proteins, inhibiting cell wall synthesis, and damaging bacterial cell membranes. Phenol compounds denature bacterial cell proteins by forming hydrogen bonds with bacterial proteins. Results in the structure of bacterial proteins damaged and enzymes were becoming inactive. In addition, the mechanism of phenol in inhibiting bacterial cell wall synthesis by poisoning the protoplasm and breaking peptidoglycan bonds.

Flavonoids contained in honey bee which also functions as antibacterial Flavonoids can damage cell membranes by inhibiting the synthesis of macromolecules, depolarizing cell membranes and inhibiting DNA, RNA and protein synthesis. inhibits the function of the cytoplasmic membrane and inhibits energy metabolism in bacteria.

The antibacterial activity of honey is also related to its osmotic condition. Honey is a supersaturation solution of sugar that has an osmotic ability. Water molecules react strongly with sugar in honey; there is only a small amount of free water left for the growth of microorganisms. The enzyme activity of glucose oxidase will produce hydrogen peroxidase. Decomposition of hydrogen peroxidase will increase reactive free radicals. These free radicals will react to organisms resulting in death. Osmotic pressure can cause microorganisms to dehydrate and die.

**CONCLUSION**

MIC honey Trigona spp against bacteria Streptococcus pyogenes occurs at a concentration of 2.5%. MBC bee honey Trigona spp against bacteria Streptococcus pyogenes occurs at a concentration of 10%. There are an influence of honey Trigona spp bacteria Streptococcus pyogenes,

**Ethical Clearance:** Taken From Health Research Ethics Committee Politeknik Kesehatan Banjarmasin

**Conflict of Interest:** Nil

**Source of Funding:** Self

**REFERENCES**

6. Dwiyanti RD, Nurilailah, I.K. Widiningisih. Water Effectiveness of Binahong Leaf Decoction (Anredera
cordifolia) Against the Growth of Salmonella typhi (Efektivitas Air Rebusan Daun Binahong (Anredera cordifolia) Terhadap Pertumbuhan Salmonella typhi). Medical Laboratory Technology Journal. 2015; 1(1), 1-6


Study of Humeral Immune Response and Some of the Blood Variables in Mice Balb/c Treated with LPS of *Klebsiella pneumoniae* Antigen and Glycyrrhiza glabra Extract

Mohammed A Hamad¹, Najeeb Mohammed Hussein², Omar I. Aljumaili³

¹Department of Biotechnology, College of Applied Science, University of Fallujah, Fallujah, Anbar 31001, Iraq
²Department of Biology, College of Science, University of Anbar, Ramadi, Anbar 31001, Iraq
³Department of Medical Laboratory Techniques, Al-Maarif University College, Anbar 31001, Iraq

ABSTRACT

In this work, lipopolysaccharides of *Klebsiella pneumonia* and extract of *Glycyrrhiza glabra* were used to investigate the humoral immunity in mice Balb/c (in vivo). In contrast, little is known about humeral immunity induced by LPS and Glycyrrhiza glabra. Some parameters were used to achieve this study, are WBC and differential count, Concentration of antibodies IgA, IgM, IgG and Concentration of complement proteins type C3 and C4 / mg / 100. The results showed there are a significant change in a parameters values in IgA, IgM, IgG and Concentration of complement proteins type C3 and C4 ,also in CBC and differentiated WBC.

Keywords: LPS, immunology, extract of *Glycyrrhiza glabra*, in vivo, *Klebsiella pneumoniae*.

INTRODUCTION

The Glycyrrhiza glabra (licorice) plant has a long and storied his Tory of utilization in both Eastern and Western societies pre-dating the Babylonian and Egyptian realms, The antiquated Greeks and Romans are known to have cultivated the plants in the third century, Licorice was a prescriptive specialist of Hippocrates in the treatment of asthma dry hack and other “pectoral diseases”¹²⁴. The licorice (Radix Glycyrrhizae or Liquiritiae radix), which is comprehensively utilized as a part of prescription and business, is gotten from the sweet foundation of different types of Glycyrrhiza. Licorice is local to southern Europe and parts of Asia; it is a standout amongst the most usually utilized homegrown ³⁵. *Klebsiella pneumoniae* is a Gram-negative bacterium that colonizes the skin, mouth, gut mucosa, and oropharynx, is likewise a crafty pathogen causing an assortment of contaminations, including bacteremia, urinary tract diseases also, liver abscesses ⁶⁷. The Glycyrrhiza glabra extricates were additionally found to Fortify humoral resistance in chickens tentatively tainted with the Newcastle infection (NDV), The talked about plant conveys various medical advantages what’s more, hostile to cancer-causing impacts because of the nearness of an- Anthraquinones, saccharides and cell reinforcement vitamins (A, C and E). ⁸,⁹,¹⁰,¹¹,¹²

METHODOLOGY

Identification of K.pneumoniae

Microscopical examination (Gram staining film)

Smears were prepared by taking a small amount of isolated colony from a bacterial culture on a glass slide by mixing a colony of the testing bacterium with a drop of distilled water, stained with Gram stain and examined using an oil immersion objective lens under 100X power.

Cultural characteristics

The morphological characteristics of isolated colonies were carefully studied with the aid of a lens 10X lens. Depending on the above two criteria the cultures were primarily classified as pure or mixed cultures.

The growth of the bacterial isolates

The bacterium *K.pneumoniae* was obtained from the College of Science, University of Iraq. This isolate
was a subculture in 10 ml Nutrient broth and incubated for 48 hr at 37 °C. Then the insulation of bacteria was achieved by taking 4 ml of the culture broth in 1000 ml of sterilized nutrient broth and incubated in the same conditions in a shaker incubator at 100 cycles/ min for 48 hours, then Centrifugation of culture broth at 3000 cycles/min for 15 min at 4 °C and the sediment was suspended in Phosphate buffer saline (pH 7.2) and centrifuged by same condition three times until getting the pure sediment and stored in 4 °C.

**Extraction and purification of LPS**

LPS of *K.pneumoniae* was extracted using a reference 13,14, and purified using the modified Vogel’s method 15,16.

**Extraction of licorice**

Licorice was extracted according to a papers 17,18,19,20,21,22.

**Laboratory animals**

Males of Swiss white mice Balb/c with old 6-7 weeks in this study which obtained from Medicative Control Center, Ministry of Health, Baghdad, Iraq

**RESULTS**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>IgA</th>
<th>IgM</th>
<th>IgG</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPS of <em>K. Pneumonia</em></td>
<td>226.18±5.44 b</td>
<td>120.9±2.66 ab</td>
<td>1170.2±21.33b</td>
</tr>
<tr>
<td>Glycyrrhiza glabra extract</td>
<td>142.82±5.11 c</td>
<td>95.5±2.87 c</td>
<td>720.24±21.45 c</td>
</tr>
<tr>
<td>LPS &amp; Glycyrrhiza glabra extract</td>
<td>187.34±3.33 a</td>
<td>121.88±2.33 a</td>
<td>1115.34±31.8 a</td>
</tr>
<tr>
<td>Phosphate buffer (control)</td>
<td>141.82±5.11 c</td>
<td>91.5±2.87 c</td>
<td>722.24±21.45 c</td>
</tr>
</tbody>
</table>

Legend: The different letters in the same column refer to the significant differences (*p*<0.05).

<table>
<thead>
<tr>
<th>Treatments</th>
<th>C3</th>
<th>C4</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPS of <em>K. Pneumonia</em></td>
<td>122.56±1.82 b</td>
<td>44.7±1.23 ab</td>
</tr>
<tr>
<td>Glycyrrhiza glabra extract</td>
<td>80.4±2.33 d</td>
<td>22.78±1.4 d</td>
</tr>
<tr>
<td>LPS &amp; Glycyrrhiza glabra extract</td>
<td>132.68±2.35 a</td>
<td>48.23±1.04 a</td>
</tr>
<tr>
<td>Phosphate buffer (control)</td>
<td>82.4±2.33 d</td>
<td>25.78±1.4 d</td>
</tr>
</tbody>
</table>
Table 3 Effect of immunization of mice using LPS antigen of *K. Pneumonia* and *Glycyrrhiza glabra* extract in the total and differential count of white blood cells.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>WBC mm³</th>
<th>Neutrophile %</th>
<th>Lymphocyte %</th>
<th>Acinophile %</th>
<th>Basophile %</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPS of <em>K. Pneumonia</em></td>
<td>12040±646.9 b</td>
<td>52.81±0.67 b</td>
<td>45.58±1.36 b</td>
<td>2.4±0.48 a</td>
<td>0</td>
</tr>
<tr>
<td>Glycyrrhiza glabra extract</td>
<td>5651±107.7 c</td>
<td>51.±0.29 c</td>
<td>47.±0.42 a</td>
<td>2.0±0.05 a</td>
<td>0</td>
</tr>
<tr>
<td>LPS &amp; Glycyrrhiza glabra extract</td>
<td>16130±508.9 a</td>
<td>54.07±1.67 a</td>
<td>44.86±1.55 c</td>
<td>2. ±0.23 a</td>
<td>0</td>
</tr>
<tr>
<td>Phosphate buffer (control)</td>
<td>5667±107.7 c</td>
<td>50.12±0.29 c</td>
<td>48.±0.42 a</td>
<td>2. ±0.05 a</td>
<td>0</td>
</tr>
</tbody>
</table>

The different letters in the same column refer to the significant differences (*p*<0.05).

**DISCUSSIONS**

Firstly, the effect of the immunization by using lipopolysaccharides (LPS) of *K. Pneumonia* and *Glycyrrhiza glabra* extract on IgG, IgM, IgA antibody level is reported in table 1. The results of the effect of LPS antigen injections of *K. Pneumonia* at IgG, IgM, IgA antibody level. The results showed significantly higher levels of antibodies in the treatment using LPS antigen, *Glycyrrhiza glabra* extract and LPS antigen as compared with the control groups and the treatment in which the extract was used. For the unit. The antigen (LPS) with *Glycyrrhiza glabra* extract showed the highest difference of antibodies IgA, IgM, IgG, 187.3, 121.8 and 1115.3, respectively, compared with the Control group and the treatment with the *Glycyrrhiza glabra* extract, which did not register any significant difference. The results of the present study agree with 23,24,25,26.27. That *K. Pneumonia* infection leads to an increase in antibody production. Elevation in antibody levels in treating mice may be due to the ability of the *K. Pneumonia* antigen to stimulate lymphocyte reproduction. The results of the current study were also agreed with 27,28. There was a significant increase in antibody levels of IgG, IgM, and IgA since the increase in the concentration of these antibodies is indicative of the development of humoral immunity.

Secondly, the effect of the immunization by using lipopolysaccharides (LPS) of *K. Pneumonia* and *Glycyrrhiza glabra* extract in a concentration of the complement proteins type C3 and C4 which the treat by LPS antigen, *Glycyrrhiza glabra* extract compared with the control groups. The antigen (LPS) with *Glycyrrhiza glabra* extract showed the highest difference in the concentration of C3 and C4 complemental proteins at 132.68, 48.23 respectively, compared with the control group and the treatment with the *Glycyrrhiza glabra* extract, which showed no significant difference. Łukawska, Polcyn-Adamczak, and Niemir, (2018) were found that the concentration of C3 and C4 complemental proteins was significantly higher in mice which the immunization by using lipopolysaccharides (LPS) compared with the control group.

Finally, The effect of the immunization by using lipopolysaccharides (LPS) of *K. Pneumonia* and *Glycyrrhiza glabra* extract in a WBC and differential WBC count are reported in table 3. The results of the present study showed significant differences towards increasing the total number of white blood cells in the treatment in which the LPS antigen with the *Glycyrrhiza glabra* extract where it gave the highest significant difference. In the differential count of white blood cells, the results showed significant differences in the number of Neutrophils compared to control groups and the treatment in which the extract was used alone. The results also showed that there were significant differences in the reduction of the number of white blood cells lymphocytes compared to control groups. The highest value of total white blood cells in the group was treated with LPS antibody with the *Glycyrrhiza*
The differential count was the highest number of treated cells with LPS with Glycyrrhiza glabra extract, where it was 54.07% compared to the control. The results of the total number of white blood cells in our study are consistent with Khaertynov et al., (2018) showing that the injection of Swedish white mice with K. Pneumonia leads to an increase in the total number of white blood cells compared with the control group.

CONCLUSION

The results showed there are a significant change in a parameters values in IgA, IgM, IgG and Concentration of complement proteins type C3 and C4, also in CBC and differentiated WBC comparative with others parameters.

Ethical Clearance: Taken from Medicative Control Center, Ministry of Health, Baghdad, Iraq.

Funding: None.

Conflict of Interest: Nil

REFERENCES

1- Isbrucker RA, Burdock GA. Risk and safety assessment on the consumption of Licorice root (Glycyrrhiza sp.), its extract and powder as a food ingredient, with emphasis on the pharmacology and toxicology of glycyrrhizin. 2006;46:167–92.


13- Westphal O. Extraction with phenolwater and further applications of the procedure; Methods in carbohydrate chem, Vol. 5.


21 Alissandrakis E, Daferera D, Tarantilis PA, Polissiou M, Harizanis PC. Ultrasound-assisted extraction of volatile compounds from citrus flowers and citrus honey. Food chemistry. 2003 Sep 1;82(4):575-82.


Spore-Forming Bacteria in Honey

Leka Lutpiatina¹, Gita Indah Febriani², Emalia Kubarti³, Ratih Dewi Dwiyanti⁴

¹Medical Laboratory Technology Poltekkes Kemenkes Banjarmasin, Mistar Cokrokusumo Street 4a Banjarbaru Indonesia, ²Medical Laboratory Technology Poltekkes Kemenkes Banjarmasin, Mistar Cokrokusumo Street 4a Banjarbaru Indonesia, ³Medical Laboratory Technology Poltekkes Kemenkes Banjarmasin, Mistar Cokrokusumo Street 4a Banjarbaru Indonesia, ⁴Medical Laboratory Technology Poltekkes Kemenkes Banjarmasin, Mistar Cokrokusumo Street 4a Banjarbaru Indonesia

ABSTRACT

Honey can be contaminated with microorganisms, especially spore-forming bacteria. Bacteria that can survive in honey are Bacillus sp and Clostridium sp. This study aimed to determine the presence of Bacillus sp. and Clostridium sp. on Trigona and Apis bee honey and honey packs after 1 year of storage. Trigona sp. honey, Apis sp. honey was taken directly from the honeycomb located in Hulu Sungai Tengah and Tanah Laut, South Kalimantan. Honey packs were 2 types of honey supplements for children taken randomly as much as 6 packs, at a drugstore in the Banjarbaru market. Honey packs were examined in laboratory before and after storage for 1 year at room temperature. Laboratory tests were performed on samples with parameters of TPC (Total Plate Count), Bacillus sp., Clostridium sp., pH and moisture content. Results of research on Trigona honey found 50% of Bacillus sp., 10% of Clostridium sp.. Apis honey contained bacillus 50%, clostridium 5%. Honey packs before storage contained 83% bacillus, 33% clostridium, after 1 year storage bacillus 50%, clostridium 50%. It is recommended to research the germination inhibition factor of bacterial spores in honey.

Keywords: Spore-forming bacteria, honey, Trigona sp., Apis sp.

INTRODUCTION

Microorganisms contained in honey can affect the quality and safety of honey. Microbes found in honey are bacteria and fungi. These microbes can come from nectar, bees, humans and dust. The bee intestine contains 70% Gram negative bacteria such as Achromobacter, Citrobacter, Enterobacter, Erwinia, Escherichia coli, Flavobacterium, Klebsiella, Proteus, and Pseudomonas. Gram negative bacteria such as coliform have commonly contaminated food ingredients. They can contaminate sauces¹, dumplings², even water sources such as wells³. It also contains 27% of Gram-positive bacteria such as Bacillus, Bacteridium, Streptococcus and Clostridium spp and 1% fungi¹.

Most bacteria could not grow and multiply in honey, but some bacteria are found in honey⁴. Spore-forming bacteria such as Bacillus sp., Clostridium perfringens, and Clostridium botulinum can survive in honey at 25°C.

Clostridium botulinum is presented in studies of honey samples in Argentina and Brazil. Honey containing Clostridium botulinum even becomes the cause of botulism in infants in California⁵. Clostridium botulinum spores contaminated honey is one source of botulism⁶.

Bacillus sp. is a bacterium that is widely found in the environment. can contaminate water, soil, air and even the air of the laboratory space⁷. Bacillus cereus is a bacteria caused food poisoning that can occur at infective dose of at least 10⁷ bacteria per gram of food. These bacteria contaminate many foods including infant formula⁸, baby rice cereal⁹, cooked rice¹⁰. The heat resistance character of Bacillus spores cause them to persist in food. This diarrhea is caused by the enterotoxins produced during the growth of bacteria in the small intestine¹¹.

METHOD AND MATERIALS

This type of research was descriptive observation. Research samples are Trigona sp. honey, Apis sp. honey, and honey packs in the form of children supplement honey. Trigona sp. honey and Apis sp. honey were taken.
directly from the honeycomb located in Hulu Sungai Tengah and Tanah Laut, South Kalimantan. Honey packs were 2 types of honey supplements for children taken randomly as much as 6 packs, at a drugstore in the Banjarbaru market. Honey packs were examined in laboratory before and after storage for 1 year at room temperature. Laboratory tests were performed on samples with parameters of TPC (Total Plate Count), *Bacillus sp.*, *Clostridium sp.*, pH and moisture content.

Bacterial isolation used thioglycolate media (Merck) and blood agar plate (Merck). Incubation of blood agar plate for aerobic and anaerobic used Oxoid Anaerobic Gas Generating Kit (Anaerobene TM 2.5L AN0025A) and Oxoid Anaerobic Indicator (BR0055B). Suspect colonies of *Bacillus sp.* on the blood agar plate have characteristics of 4 - 5 mm colony diameter, pieces, rough, grey, uneven edges, slightly wavy, an-hemolytic. Suspect colonies of *Clostridium sp.* on blood agar plate have characteristics of 5 - 10 mm colony diameter, clear, smooth, shiny, creeping, darker colored in the middle of the colony, keeping, hemolytic. Colonies that grew on media were colored with Gram stain and produced images of Gram-positive bacteria with spored-bacil form. Media for biochemical tests were Simon citrate (Merck), SIM (Merck), TSIA (Merck), glucose, lactose, mannose, maltose, saccharose. Biochemical test results for *Bacillus sp.* were glucose +, lactose -, mannose +/-, maltose +/-, sakarosa +, indol -, motility +, citrate -, TSIA: slope -, base +, H2S -, gas -. Biochemical test results for *Clostridium sp.* were glucose +, lactose / +, mannose -, maltose +, sakarosa +, indol -, motility +, citrate -, TSIA: slope -, base +, H2S -, gas -.

Measurement of honey pH used pH meter (Lutron PH-209), moisture content was calculated by gravimetric method.

**RESULT AND DISCUSSION**

**Table 1. Spore Forming Bacteria and *Trigona sp.* Honey Characteristics**

<table>
<thead>
<tr>
<th>Number</th>
<th>Sample Code</th>
<th>Spore-Forming Bacteria</th>
<th>pH</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MKA</td>
<td>-</td>
<td>3.88</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>2</td>
<td>MKB</td>
<td>-</td>
<td>3.54</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>3</td>
<td>MKC</td>
<td>-</td>
<td>3.19</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>4</td>
<td>MKD</td>
<td>-</td>
<td>3.60</td>
<td>Brown</td>
</tr>
<tr>
<td>5</td>
<td>MKE</td>
<td>-</td>
<td>3.15</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>6</td>
<td>MKF</td>
<td><em>Bacillus sp</em></td>
<td>3.01</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>7</td>
<td>MKG</td>
<td><em>Bacillus sp</em></td>
<td>3.31</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>8</td>
<td>MKH</td>
<td>-</td>
<td>3.74</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>9</td>
<td>MIK</td>
<td>-</td>
<td>3.18</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>10</td>
<td>MKJ</td>
<td><em>Bacillus sp</em></td>
<td>3.20</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>11</td>
<td>MKK</td>
<td><em>Bacillus sp</em></td>
<td>3.27</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>12</td>
<td>MKL</td>
<td><em>Bacillus sp</em></td>
<td>3.14</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>13</td>
<td>MKM</td>
<td><em>Bacillus sp</em></td>
<td>3.16</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>14</td>
<td>MKN</td>
<td><em>Bacillus sp</em></td>
<td>3.11</td>
<td>Brown</td>
</tr>
<tr>
<td>15</td>
<td>MKO</td>
<td><em>Bacillus sp</em></td>
<td>3.19</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>16</td>
<td>MKP</td>
<td>-</td>
<td>3.48</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>17</td>
<td>MKQ</td>
<td><em>Bacillus sp</em></td>
<td>3.01</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>18</td>
<td>MKR</td>
<td>-</td>
<td>3.57</td>
<td>Brown</td>
</tr>
<tr>
<td>19</td>
<td>MKS</td>
<td><em>Bacillus sp</em></td>
<td>3.23</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>20</td>
<td>MKT</td>
<td>-</td>
<td>3.09</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>Total (%)</td>
<td></td>
<td></td>
<td>10(50)</td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Spore Forming Bacteria and *Apis sp.* Honey Characteristics

<table>
<thead>
<tr>
<th>Number</th>
<th>Sample Code</th>
<th>Spore-Forming Bacteria</th>
<th>pH</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LMA</td>
<td>Clostridium sp</td>
<td>6,4</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>2</td>
<td>LMB</td>
<td>-</td>
<td>5,1</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>3</td>
<td>LMC</td>
<td>-</td>
<td>4,3</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>4</td>
<td>LMD</td>
<td>-</td>
<td>5,9</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>5</td>
<td>LME</td>
<td>Bacillus sp</td>
<td>4,6</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>6</td>
<td>LMF</td>
<td>Bacillus sp</td>
<td>4,0</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>7</td>
<td>LMG</td>
<td>Bacillus sp</td>
<td>4,7</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>8</td>
<td>LMH</td>
<td>Bacillus sp</td>
<td>4,2</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>9</td>
<td>LMI</td>
<td>Bacillus sp</td>
<td>5,9</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>10</td>
<td>LMJ</td>
<td>-</td>
<td>5,7</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>11</td>
<td>LMK</td>
<td>Bacillus sp</td>
<td>6,0</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>12</td>
<td>LML</td>
<td>Bacillus sp</td>
<td>6,2</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>13</td>
<td>LMM</td>
<td>-</td>
<td>3,4</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>14</td>
<td>LMN</td>
<td>-</td>
<td>5,3</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>15</td>
<td>LMO</td>
<td>Bacillus sp</td>
<td>4,7</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>16</td>
<td>LMP</td>
<td>-</td>
<td>4,9</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>17</td>
<td>LMQ</td>
<td>Bacillus sp</td>
<td>4,1</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>18</td>
<td>LMR</td>
<td>-</td>
<td>4,2</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>19</td>
<td>LMS</td>
<td>-</td>
<td>4,2</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>20</td>
<td>LMT</td>
<td>Bacillus sp</td>
<td>4,4</td>
<td>Bright Yellow</td>
</tr>
</tbody>
</table>

Total (%) 10(50) 1(5)

Table 3. Bacteria in Honey Packs

<table>
<thead>
<tr>
<th>Number</th>
<th>Sample Code</th>
<th>Before Storage</th>
<th>After Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Code</td>
<td>Average Number of Bacteria (Colony/g)</td>
<td>Spore-Forming Bacteria</td>
</tr>
<tr>
<td>1</td>
<td>A1</td>
<td>2,31 x 10^2</td>
<td>Bacillus sp</td>
</tr>
<tr>
<td>3</td>
<td>B1</td>
<td>1,40 x 10^2</td>
<td>Bacillus sp</td>
</tr>
<tr>
<td>5</td>
<td>C1</td>
<td>9,52 x 10^1</td>
<td>Bacillus sp Clostridium sp</td>
</tr>
<tr>
<td>2</td>
<td>A2</td>
<td>1,61 x 10^2</td>
<td>Bacillus sp</td>
</tr>
<tr>
<td>4</td>
<td>B2</td>
<td>1,631 x 10^3</td>
<td>Bacillus sp Clostridium sp</td>
</tr>
<tr>
<td>6</td>
<td>C2</td>
<td>1,75 x 10^3</td>
<td>-</td>
</tr>
</tbody>
</table>

Total (%) 5(83) 2(33) 3(50) 3(50)
Bacterial contamination in honey bee might also come from soil containing bacterial spores. Bacteria could live on moist and humid soils and environments where many livestock lived\textsuperscript{13}. The spore-forming bacteria found in honey in this study were \textit{Clostridium sp} and \textit{Bacillus sp}. This study was in line with research on honey samples in Argentina found \textit{Clostridium botulinum} as much as 1.1\% and in brazil as much as 7.06\%. \textit{Bacillus cereus} was found as much as 42\% in baby food in Isfahan, Iran\textsuperscript{14}. \textit{Clostridium sp.} and \textit{Bacillus sp.} form the metabolically inactive endospores but are resistant to adverse environmental conditions including heat. Spores could germinate under favorable conditions and could cause food spoilage and food poisoning after consumption\textsuperscript{15}.

The genera \textit{Clostridium} and \textit{Bacillus} are commonly found in soil, water, and gastrointestinal tracts of insects and animals, as well as humans. Both genera grow in low oxygen environments. \textit{Clostridia} require more anaerobic atmosphere, but some species is aero-tolerance. \textit{Clostridium} and \textit{Bacillus} pathogen species can survive in and out of various host species. The disease is often associated with toxins and protein spores that include gangrene gas, food poisoning, diarrhea, pseudomembranous colitis, and enterotoxemia\textsuperscript{16}. The pH values of all honey samples in this study were acidic (pH 3.01-6.4). The lowest acidity was detected in \textit{Trigona sp.} (3.30 ± 0.246), followed by \textit{Apis sp.} honey (4.91 ± 0.856), and honey packs (5.70 ± 0.19). There was a significant difference of honey pH between \textit{Trigona sp.} with \textit{Apis sp.} honey (P <0.05). The pH of honey in this study was close to the pH value of honey in the previous study, ie Yemen, Egypt, Saudi, Kashmir (pH 4.114-4.637)\textsuperscript{17}. Other studies have also shown that the pH of honey is close to similar values, ie in Indian, Algerian, Brazilian, Spanish and Turkish honey (pH 3.49-4.70)\textsuperscript{18}. Honey with acidic pH is not a good medium for microbial growth. The pH 7.4 media supports better spore growth than pH 5.5\textsuperscript{19}. Spores were inactivated at lower pH values of the media\textsuperscript{20}.

The degree of honey acidity correlates with the fermentation of sugars in honey into organic acids. The acidity of honey causes honey to stabilize against microbial decay Bogdanov et al. (2008). The acidity of honey may also indicate that the honey sample has a high mineral content\textsuperscript{21}.

The results showed that after 1 year storage at room temperature honey packs tend to show increased number of germs, such as \textit{Bacillus sp.} and \textit{Clostridium sp}. The food composition and storage conditions determine germination and development of living spores\textsuperscript{22}. The composition of honey that contained more than 180 substances, including amino acids, enzymes, proteins, vitamins, minerals, ash, organic acids and phenol compounds\textsuperscript{18} can be a good growth medium for microbes.

The color of honey varies like dark yellow, blackish brown or black. The most important aspect that affect the marketing value of honey is the color of honey. Color change may be associated with mineral content, heavy metal contamination, and high temperature or light exposure\textsuperscript{23}. The results showed the honey color were bright yellow to brown. \textit{Trigona sp.} honey tend to have

\begin{table}[h]
\centering
\caption{pH, Water Content in Honey Packs}
\begin{tabular}{|l|c|c|c|c|}
\hline
\textbf{Sample Code} & \textbf{pH} & \textbf{\% water content} & \textbf{Expired Time} & \textbf{Suplement honey composition on packs} \\
\hline
A1 & 6.0 & 14.63 & Nov 2016 & Honey Curcuma Date Extract Propolis \\
B1 & 5.82 & 13.90 & Mei 2017 & \\
C1 & 5.75 & 15.28 & April 2017 & \\
\hline
A2 & 5.57 & 21.73 & Maret 2019 & Honey Habbatusauda Date Extract Propolis \\
B2 & 5.55 & 23.46 & Feb 2019 & \\
C2 & 5.52 & 22.97 & Mei 2019 & \\
\hline
\end{tabular}
\end{table}
more brown color, a more acidic pH and a more watery texture. The color of honey is affected by the mineral content in it\textsuperscript{24}. This is because Trigona sp bees consume more minerals. The amount of Trigona sp. Honey production is much less because these bees produce more propolis\textsuperscript{25}.

**CONCLUSION**

Trigona honey contained bacillus sp 50%, clostridium 10%. Apis honey contains bacillus 50%, clostridium 5%. Honey packs before storage contains 83% bacillus and 33% clostridium. After 1 year storage honey packs contains bacillus 50% and clostridium 50%.

**Ethical Clearance:** Taken From *Health Research Ethics Committee* Politeknik Kesehatan Banjarmasin

**Conflict of Interest:** Nil

**Source of Funding:** Self

**REFERENCES**


4. M. Gilliam and D. Prest, Microbiology of feces of the larval honey bee, Apis mellifera, J. Invertebr. Pathol. 1987; 47(1), 70–75


17. S. Ouchemoukh, H. Louaileche, and P. Schweitzer, Physicochemical characteristics and pollen spectrum of some Algerian honeys, Food Control. 2007; 2007(18), 52–58

Bacillus Cereus Spores, Int J Food Microbiol. 2015; 201, 27–34


22. S. Bogdanov, Physical Properties of Honey. Bee Product Science; 2010


Comparison of CT, MRI, and Diffusion–Weight MRI in Differentiation Cystic Brain Tumors (Prospective Study)

Hassan Falah Al-Khafaji¹, Kassim A. H. Taj-Aldean²

¹Babylon Health directorate, Babylon province, Hilla, IRAQ.
²Dept. of Surgery/ College of Medicine / University of Babylon, Hilla, Iraq

ABSTRACT

Objective: To determine the ability of MRI, diffusion–weight MRI images and ADC (apparent diffusion coefficient) in comparison to CT scan to differentiation cystic brain tumors.

Method: From January 2017 to October 2018, this prospective study included 60 patients (age range 20 to 85 years, mean age 55 years) diagnosed clinically as having cystic brain tumor. A conventional MRI was done on Philips MRI a 1.5T using T2, T1 and fat-suppressed technique and echo-planar spin-echo sequence diffusion weight and ADC is carried for all patients with CT scan.

Results: All CT scan and MR imaging features were categorized brain lesion as cystic brain tumor according to the features of imaging which were compared the result with histopathological findings. Sixty patients, 34 male and 26 female the diagnosis was confirmed with pathological findings which included Primary malignant cystic brain tumors 16 (20%) Primary benign cystic brain tumor 24 (26%) and Metastatic tumor 20 (32%). The sensitivity for diagnosis primary malignant cystic tumor 60%, Primary benign cystic brain tumor 100% and the sensitivity of DWI for diagnosis metastasis tumor 81%. Diffusion–weight MRI and ADC is good modality for differentiation cystic necrotic tumor.

Conclusion: According to our results we concluded that MRI has more accuracy than CT scan for diagnosis brain tumors and biopsy correlation. Both CT scan and MRI reports for diagnosis of benign or malignant tumor compared with pathologic findings and they were not significant.

Keywords: Brain Neoplasms, Computerized Tomography, Magnetic Resonance Imaging, Diffusion–Weight, ADC (apparent diffusion coefficient).

INTRODUCTION

There is MRI protocol for preoperative cystic brain tumor assessing include T1 weighted with gadolinium enhanced, T2 weighted and diffusion weighted to evaluate the lesion, vascularity and blood brain barrier integrity these sequence result in correct diagnosis in majority of cases¹.

all primary benign tumor can be diagnosis by DWI. The sensitivity of DWI for diagnosis of primary benign cystic brain tumor is 100% ²,³.

computed tomography CT) and magnetic resonance image (MRI) are being routinely used to screen the neonate for plausible intracranial problems ⁴,⁷.

Diffusion –weighted MR has an establish role in the differential diagnosis between brain abscess, cystic tumor and between epidemroid cyst and arachnoid cyst⁶.

CT scan remains a good choice in diagnosis of some conditions like bone or vascular involvement and metastases to the skull base ⁹.

There is protocol for typical MRI in preoperative assessing tumor of brain include T2 and T1 weighted, diffusion weighted to evaluate the lesion T1 weighted with gadolinium enhanced, blood brain barrier integrity, irregularity and vascularity these sequence result in correct diagnosis in majority of cases ¹⁰,¹¹.

The aim of this study was to investigate whether the different cystic brain tumors can be differentiated
on CT scan, MRI and diffusion–weight (MRI) and apparent diffusion coefficient (ADC) on the basis of their appearance and characterization of signal intensity.

**PATIENTS AND METHOD**

In this cross-sectional study, 60 patients aged 20–85 years (mean age 50 years) with clinically suspected brain tumor were included. The patients were having different clinical presentations; headache 42 (70%), Dizziness 12 (20%), and Confusion 6 (10%).

For all patients, CT scan, conventional MRI preoperative and diffusion–weighted MRI were done to show characterization of brain tumor by CT appearance whether cystic or solid. All solid tumors were excluded from this study, then MRI signal intensity was done.

This study was carried out in department of surgery, Hilla teaching hospital, Iraq, in the period extended from January 2017 to October 2018. Chief complains of all patients documented from their medical record. Pathologists evaluated the lesions as benign or malignant, without any information about CT scan or MRI reports. CT scan reported cystic or solid lesion, with or without calcification and edema, shifting and enhancement. CT scan or MRI reports were concluded lesions as benign or malignant. The MRI pictures had been seen and confirmed by two radiologists to differentiate the brain tumor whether followed by operative exploration in the same hospital, the median time between initial MRI and surgery 31 days (range 5 days to 76 days).

CT scan by Philips 64 slice then Magnetic resonance imaging (MRI) was carried out on a Philips 1.5T system using multiplanar sequence T2, T1 and fat-saturation and sequence diffusion weight is carried for all subjects. All MR imaging features were categorized according to the features of imaging as malignant or benign without clinical details.

**MRI Protocol**

In this study Philips MRI 1.5 T units was used, with different planes (coronal, sagittal and axial) see the brain lesion whether cystic or solid, site, texture, extension, and intensity. Used multiplanar sequence diffusion weight with ADC do for all patients. In this study, the thickness of slice was 5 mm and the slices numbers averaged 14, which decrease the effects of eventual motion and volume partial between diffusion-weighted imaging and conventional MR.

**RESULTS**

Sixty subjects admitted in teaching hospital in Babylon in Iraq have different symptom and signs. In this study, age of patients included ranged from 25-85 years mean age (55 year), 34 male and 26 female, then routine CT scan and conventional MRI examination was done, in conventional MRI examination show the patient normal or abnormal, if there is mass in brain or not, the abnormal patient who have cystic mass in brain do DW MRI in department of radiology in the same hospital to determine the mass, appearance of mass, nature and side then do ADC (apparent diffusion coefficient), the appearance of MRI are read by two radiologist without known history of patient to determine the diagnosis and mention the report, then all patient do surgery in in the same hospital. In all 60 patients the diagnosis was confirmed with histological evaluation which include primary benign cystic tumor 24 (40%), have primary malignant brain tumor (cystic glioma) 16 (26%) and patients have metastatic tumors 20 (34 %).

All primary benign cystic brain tumors (arachnoid cyst and epidermoid cyst) can diagnosed by CT scan show hypodense area fluid density (Figure 1), DWI and ADC show high signal on DW MRI and low signal on ADC, so the sensitivity for diagnosis arachnoid cyst and epidermoid cyst on DW MRI are 100%. (Figures 2).

The pattern of enhancement on CT scan and MRI can be shown in (Table 2).

Sixty patients by using CT scan, which 13 (54%) were diagnosed benign from 24 benign tumor, 10 (62.5%) malignant from 16 malignant tumor and 9 (45%) were diagnosed metastasis from 20 metastasis tumor. Sensitivity, specificity, positive predictive value and negative predictive value of CT scan were 83%, 10%, 93% and 3% respectively. The accuracy of this method was 78%.

While by MRI Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of MRI were 94%, 27%, 93%, 3% and 88% respectively.

The sensitivity for diagnosis primary cystic malignant brain tumor only 6 from 16 primary malignant cystic brain tumor (Figure 3) show hyper intense on DWI and hypo intense on ADC while the remain primary cystic tumor 6 show hypo intense on DWI and hyper intense on ADC Table 1) make the sensitivity of DWI foe diagnosis primary malignant cystic tumor 60%, in
metastatic tumors 4 out of 20 metastatic tumors showed hyper intense on DWI and hypo intense on ADC while the remain showed hypo intense on DWI and hyper intense on ADC make the sensitivity of DWI for diagnosis metastasis tumor 81%. as shown in (Figure 4).

Table 1: Signal intensity of cystic cerebral tumor on DWI and ADC

<table>
<thead>
<tr>
<th>Type of cerebral lesions</th>
<th>Number</th>
<th>DWI</th>
<th>ADC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary malignant cystic brain tumors</td>
<td>N=16</td>
<td>High signal</td>
<td>Low signal</td>
</tr>
<tr>
<td></td>
<td>N=0</td>
<td>Low signal</td>
<td>High signal</td>
</tr>
<tr>
<td>Metastatic tumors</td>
<td>N=15</td>
<td>Low signal</td>
<td>High signal</td>
</tr>
<tr>
<td></td>
<td>N=5</td>
<td>High signal</td>
<td>Low signal</td>
</tr>
<tr>
<td>Arachnoid cyst</td>
<td>N=14</td>
<td>Low signal</td>
<td>High signal</td>
</tr>
<tr>
<td></td>
<td>N=0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epidermoid</td>
<td>N=10</td>
<td>High signal</td>
<td>Low signal</td>
</tr>
<tr>
<td></td>
<td>N=0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Pattern of enhancement on CT scan and MRI

<table>
<thead>
<tr>
<th>D/D</th>
<th>CT scan</th>
<th>MRI T1</th>
<th>T2</th>
<th>Gad enhanced DWI</th>
<th>ADC</th>
<th>MRS</th>
<th>PET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary cystic neoplasm</td>
<td>Hypodense with rim enhancement</td>
<td>Hypointense</td>
<td>Hyperintense</td>
<td>Thick rim or nodular</td>
<td>variable</td>
<td>high</td>
<td>Suppressed NAA and Creatinine. Elevated choline and lactate in high grade glioma. Increased Metabolic Uptake</td>
</tr>
<tr>
<td>Metastasis</td>
<td>Hypodense lesions with rim enhancement</td>
<td>Hypointense</td>
<td>Hyperintense</td>
<td>Thick rim or nodular</td>
<td>Dark</td>
<td>high</td>
<td>Suppressed NAA and Creatinine. Elevated choline and lactate variable. Increased Metabolic Uptake</td>
</tr>
<tr>
<td>Primary benign cystic tumor</td>
<td>Ring enhancing lesions with surrounding edema, multilobulated lesions may be seen s/o daughter abscesses</td>
<td>Core hyperintense, surrounding hypointense edema</td>
<td>Cavity hypointense, surrounding hyperintense edema</td>
<td>Ring enhancement</td>
<td>Bright</td>
<td>low</td>
<td>Lactate, lipids, amino acids, acetate and succinate peaks. Increased Metabolic Uptake</td>
</tr>
</tbody>
</table>

MRI=Magnetic resonance imaging, DWI=Diffusion weighted imaging, ADC=Apparent diffusion coefficient, MRS= Magnetic resonance spectroscopy, PET=positron emission tomography, CT= computerized tomography, NAA=N acetyl aspartate.
DISCUSSION

According to our result, CT scan and MRI were sensitive imaging in intra cranial tumors but they are not specific. Their high positive predictive value and low negative predictive value also made them reliable diagnostic procedures when it is difficult to access mass directly.

In this study relation between CT scan findings and pathologic findings surveyed and concluded that some findings like cystic or solid lesions, calcification, shifting, edema and enhancement did not predispose biopsy reports, but hydrocephaly found as a predictive finding in CT scan reports for determining malignant tumors.

MRI is a good module using multiple relaxation properties seen in tissue types to provide information on content of masses of soft tissue, the result of this information show the character of masses of soft tissue. Diffusion-weighted MR imaging is found to be highly specific and sensitive for the diagnosis of cerebral infarction in acute stage.

In this study, the sensitivity of DWI 90% for diagnosis of primary brain tumor. This result goes with finding of Bukte. DWI (diffusion–weight MR imaging) has shown promise in differentiating malignant neoplasm and brain abscess the ability of DWI to diagnosed brain abscess enables a neurosurgeon to change planning of management, all brain abscess restricted water diffusion as indicated by hyper intense on DWI and diminished on ADC this finding similar to finding by Leuthardt.

In this study we focused on ability of DWI and ADC to characterize necrotic tissue from water content of brain mass that DAI restricted all water in abscess causing the abscess high signal on it and low signal on ADC this finding similar to finding by several reports.

In this study relation between CT scan findings and pathologic findings surveyed and concluded that some findings like cystic or solid lesions, calcification, shifting, edema and enhancement did not predispose biopsy reports, but hydrocephaly found as a predictive finding in CT scan reports for determining malignant tumors.

In this study the sensitivity of DWI for diagnosis abscess are 100 %, for diagnosis primary benign cystic brain tumor (arachnoid and epidermoid cyst) are 100 %
this result goes with finding of several reports\textsuperscript{13}.

In tumor lesion presence large areas of necrosis can be well detected on the elevated ADC\textsuperscript{17}. One of the early reported applications of diffusion imaging in brain tumors diagnosis was the differentiation between primary benign epidermoid and extra-axial cysts\textsuperscript{18}. In our study found Diffusion-weighted imaging is good modality for distinguishing brain abscess from cystic or necrotic tumor lesions, is more best than performing conventional MRI alone the finding similar to finding by Chang\textsuperscript{19}.

In this study, patients were classified into three main groups; first group: the patients with cystic or necrotic malignant brain tumors of high grade necrotic glioma (16 cases); second group: is benign cystic masses, arachnoid and epidermoid cysts (24 cases); and third group: metastatic cystic tumor (20 cases).

On visual assessment, all brain abscesses showed ring enhancement at post contrast T1 weighted images and brain abscesses are hyper intense on DWI and hypo intense on ADC maps (restricted diffusion) make the sensitivity of diffusion weighted for diagnosis brain abscess 100% this result similar to finding by Leuthardt\textsuperscript{20}.

**CONCLUSION**

According to our results we concluded that MRI has more accuracy than CT scan for diagnosis brain tumors and biopsy correlation. Both CT scan and MRI reports for diagnosis of benign or malignant tumor compared with pathologic findings and they were not significant. There is widely applied of Diffusion-weighted MRI imaging for diagnosis of various diseases including the detection of cystic brain tumors from abscess, and distinguishing arachnoid from epidermoid cysts.

**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.

**Acknowledgement:** The authors would like to thank Prof. Alaa Al-Charrakh, Babylon University, for his critical proofreading of the manuscript.

**Ethical Clearance:** The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

**REFERENCES**


Health Literacy as a Risk Predictor of Cardiovascular Diseases among Informal Sector Worker in Makassar City

Novita Medyati¹, Ridwan Amiruddin², Arsunan, A.A ³, Muhammad Syafar⁴, Saifuddin Sirajuddin⁵, Risnah⁶

¹Doctor Program, Faculty of Public Health, UNHAS Makassar; ²Department of Occupational Health Sciences, Public Health Faculty, UNCEN Papua, ³Department of Epidemiology, Faculty of Public Health, UNHAS Makassar; ⁴Department of Epidemiology, Faculty of Public Health, UNHAS Makassar; ⁵Department of Behavioral Sciences at the Public Health Faculty, UNHAS Makassar; ⁶Department of Nutrition at the Public Health Faculty, UNHAS Makassar; ⁷Department of Nurse, Faculty of Medicine and Health Sciences, State Islamic University of Alauddin, Makassar

ABSTRACT

Background: Health literacy is a concept that can influence a person’s health status. The purpose of this study was to determine the relationship between health literacy and the risk of cardiovascular disease in informal sector cooks in Makassar City. Method: The quantitative study method with cross sectional design was carried out in the working area of the Tamalanrea Health Center in 80 informal sector cooks determined by purposive sampling. Data collection uses HLS-EU prevention of cardiovascular disease, and the form of the Jakarta Cardiovascular Score. Processing data with SPSS version 20 for Windows, analyzing data with Chi Square test on 95% CI and \( \rho<0.05 \). The results showed that more than half of the informal sector cooks had a low literacy level (63.7%) and were in the high risk category of cardiovascular disease (52.5%). Result: There is a significant relationship between low health literacy and the risk of cardiovascular disease \( (p = 0.006) \). Conclusion: low health literacy is very influential on the risk of cardiovascular disease. It is recommended to use a preventive health based literacy model for informal sector workers to be able to be independent in seeking their health.

Keywords: Health literacy, Risk of cardiovascular disease.

INTRODUCTION

According to WHO (2016), deaths from cardiovascular disease have affected more than 75% of the population in low and middle income countries.¹ This condition is caused due to the fact that integrated primary health care programs for early detection and treatment for people who have risk factors are often not utilized properly, so the disease is slowly detected and eventually experiences death.²

Indonesia is one country that has a high risk of premature death. According to WHO (2016), non-communicable diseases are estimated at 75% as a cause of death from all deaths, as much as 35% of the proportion of deaths caused by cardiovascular disease and predicted to continue to increase.³

The international world continues to try to reduce the incidence of non-communicable diseases. World Heart Federation (WHF) has initiated a cardiovascular disease prevention and control program called 25 by 25 Global Target. This program was created with the aim of reducing the premature mortality rate due to CVD by 25% in 2025.⁴

On national scale, Indonesia has taken several control measures against the risk of cardiovascular disease, such as making guidelines for controlling heart and blood vessel disease⁵, GERMAS programs (Healthy Life Society Movement), and CERDIK appeal (regular health checks, eliminate cigarette smoke, diligently exercise physically, healthy and balanced diet, adequate rest, and manage stress), but the results are not maximal. The results of the Basic Health Research (Risksda)
prove the increase in cases of cardiovascular disease in 2018 compared to 2013.\textsuperscript{6,7} 

Research conducted by Kurniawidjaja (2007) in several companies in Indonesia, found that 40\% - 58.3\% were caused by cardiovascular disease.\textsuperscript{6} Informal sector cooks are workers with a high prevalence rate of the incidence of hypertension. Research conducted by Bosu (2015) found the highest prevalence of hypertension in cooks in the West African region at 68.9\% compared to other types of work.\textsuperscript{8} Factors causing cardiovascular disease in workers, can be caused by the work environment such as noise,\textsuperscript{10-13} work stress,\textsuperscript{14-16} chemicals in the form of pollutants,\textsuperscript{17,18} workloads,\textsuperscript{19,20} and healthy lifestyle.\textsuperscript{8,14} Kurniawidjaja reported that case identification results of cardiovascular disease in workers at an automotive factory and found 23\% of workers at high risk, 50\% at risk of developing cardiovascular disease, where the dominant risk factors for health problems were factors that could be intervened with healthy life behaviors.\textsuperscript{8} 

The results of a study conducted by Won et al. (2013) found that knowledge is a significant predictor of cardiovascular events in workers.\textsuperscript{21} According to Setyawaty, the lack of knowledge and skills regarding occupational health and safety in the workplace has resulted in workers being at risk of getting accidents due to work and work-related illnesses and diseases due to work relations.\textsuperscript{22} 

Health literacy is what underlies good health knowledge and is very influential on the healthy behavior of individuals.\textsuperscript{23} Research conducted by Andrade et al (2017), to characterize specific knowledge of cardiovascular disease, especially stroke and myocardial infarction (MI), and its relationship with sociodemography factors, health knowledge and clinical history, in 1624 Portuguese residents, found important gaps in knowledge related to cardiovascular health in Portuguese society. Andrade et al (2017), suggested the need for a strategy and practice of health education to improve knowledge of cardiovascular health among the Portuguese population.\textsuperscript{24} 

METHOD 

This study used a cross sectional study from January to February 2018 on 80 informal sector cooks determined by purposive sampling technique. Data collection used the HLS-EU cardiovascular disease questionnaire, consisting of 15 questions for disease prevention for workers.\textsuperscript{23} Health literacy questionnaire is a standard questionnaire but researchers modified the questionnaire so that it was easier to understand by respondents without changing the purpose of each question. 

The results of the validity test by comparing the r value of the table with r count obtained by the value of r count (0.635 - 0.853)> r table, so the questionnaire was declared valid. The instrumental reliability test results are using the Cronbach’s Alpha formula, obtained by the reliable coefficient value of 0.943> 0.60 then the statement is said to be reliable. Determination of the risk of cardiovascular disease using the form of the Jakarta Cardiovascular Score. Jakarta Cardiovascular Score is a standard questionnaire so that validity and reliability tests are not carried out. Obtained from the risk value for gender, age, blood pressure measured using a Sphygmomanometer, body mass index (height measured by microtoise which has a precision of 0.1 cm; body weight was measured by tread scales), smoking, diabetes based on the statement of respondent has ever been diagnosed by a health worker and physical activity based on the statement of respondents who refer to the criteria in the Jakarta Cardiovascular Score, with a sensitivity level of 77.9\% and high specificity of 90\%, against the Framingham study scoring.\textsuperscript{25} Processing data with SPSS version 20 for Windows, analyzing data with Chi Square test on 95\% CI and \( p <0.05 \).
Figure 2 shows the identification of respondents’ Health Literacy using the HLS-EU questionnaire, where the largest percentage of respondents was in the category of low Health Literacy (63.8%).

**Table 1: Relationship between Health Literacy and the Risk of Cardiovascular Disease in Respondents**

<table>
<thead>
<tr>
<th>Health Literacy</th>
<th>Risk of cardiovascular disease</th>
<th>Total</th>
<th>ρ - Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Low</td>
<td>33 (64.7%)</td>
<td>12 (23.5%)</td>
<td>6 (11.8%)</td>
</tr>
<tr>
<td>Sufficient</td>
<td>9 (31.0%)</td>
<td>9 (31.0%)</td>
<td>29 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>42 (52.5%)</td>
<td>21 (26.3%)</td>
<td>17 (21.3%)</td>
</tr>
</tbody>
</table>

*p value < 0.05*

Table 1 shows a high percentage of respondents with low literacy, had a high risk of cardiovascular disease (64.7%). There is a trend of an increased risk of cardiovascular disease in respondents who have low health literacy. Table 1 also shows a significant correlation between the level of health literacy and the risk of cardiovascular disease.

**DISCUSSION**

Health literacy is a process carried out by a person related to his health condition in terms of making appropriate decisions so that he is always in a healthy condition.26-28 The results of this study indicate the level of health literacy of respondents in the less category (63.7%).

The level of health literacy that is lacking is a condition that must receive attention from the government because it involves a basic understanding of the risk of an illness. The level of health literacy can be influenced by several determinants, the first is a personal determinant that includes age, gender, race, socio-economic status, education, employment and income, and the second is the determinants of society and the environment including demographic conditions, culture, language and community systems) and social determinants (family support and relations).28,29

In addition, access to health information also affects a person’s ability to obtain health information and education from health care providers.30 Especially for informal sector workers, inherent characteristics such as low education levels, lack of access to health information and health services, will ultimately lead to poor workers’ health. The results of a survey conducted by the ILO in collaboration with Jamsostek (Workers’ Social Security), found that 80% of informal sector workers do not have health insurance other than expecting guarantees from their families.31

Regarding the risk of cardiovascular disease, the results of this study prove a significant relationship between the level of health literacy and the risk of cardiovascular disease. There is an increasing trend risk of cardiovascular disease in workers with low health literacy than workers with sufficient health literacy.

Research conducted by Ko et al (2013), corroborates the results of this study. Ko et al. conducted a study of
the relationship between health literacy and knowledge and control of disease in patients with hypertension in Singapore, found a significant relationship between health literacy of patients with hypertension and knowledge of hypertension.32

Relationship between health literacy with different cases of disease is carried out by several researchers, namely Kalichman and Rompa (2000) and Giselle et al (2006). This study provides evidence that health literacy is a factor that has a significant relationship with the health and treatment of patients with HIV AIDS.26,33 According to Nutbeam, health literacy is the goal of the concept of behavioral-based health and communication education that aims not only at lifestyle changes but also to achieve awareness of the effects of health and encourage individuals and communities to act in dealing with health problems.27

This study proves that informal sector workers with a low level of health literacy have the potential to experience the risk of cardiovascular disease, so a model of preventive action based on health literacy needs to be made to

**CONCLUSIONS**

This study shown that health literacy greatly influences cardiovascular disease. informal sector workers with a low level of health literacy have the potential to experience the risk of cardiovascular disease.

**RECOMMENDATIONS**

Health literacy model are a recommended to prevent cardiovascular disease in informal sector workers in order to be independent in seeking their health.

**Conflict of Interest**: There is no conflict of interest.

**Ethical Clearance**: Taken from Hasanuddin University Ethics Committee with number: 768/H4.8.4.5.31/PP36-KOMETIK/2017.

**Source of Funding**: Researcher (Self)

**REFERENCES**

4. Rilantono.L & Rahajoe.A.U. Cardiovasculare in woman: Challenge in 21 Century. Faculty od Medicine Publisher, Indonesia University; 2014 P
15. Van Droogenbroeck F, Spruyt B. Do teachers
have worse mental health? Review of the existing comparative research and results from the Belgian Health Interview Survey. Teaching and Teacher Education. 2015;51:88-100.


Evaluation and Strategic Planning of Playground for Kids to Reduce the Accident Risk (Case Study in Immanuel Kindergarten Batu City)

Qomariyatus Sholihah¹, Sylvie Indah Kartika Sari¹, Vania Putri Pramuditha¹, Herlambang Dwi Prayoga¹, Aprizal Satria Hanafi²

¹Departement of Industrial Engineering, Faculty of Engineering, University of Brawijaya, M.T. Haryono Street 167, Malang, East Java, Indonesia, ²Master of Epidemiology Student, School of Public Health, University of Indonesia, Depok, West Java, Indonesia

ABSTRACT

Essentially, kids world are identical with playing activities, mainly in early age kids. Through games, children are experiencing the learning process. This study aims to evaluate and provide recommendations to reduce the risk of accidents at Kindergarten. The result shows that there were several accidents experienced by children when playing in a playground such as bumping into a friend, crashing into a game device, stumbling, and falling from the playground. The playground in Immanuel Kindergarten generally has a relatively narrow and hollow place but has a clear guardrail so that children remain within reach. Some students play not according to how to play the tool, which increases the risk of falling. In general, there are differences between playgrounds at Immanuel Kindergarten and playground standards (p value 0.03<0.05), which is caused by several factors that influence human, method, equipment and environment. The improvements suggestions are referred to the strategy that is most likely to be implemented, namely the SO strategy to provide prior knowledge to children before playing and manage to play facilities.

Keywords: playground, evaluation, t-test, fishbone, SWOT

INTRODUCTION

Children are unique individuals and have all the potential that can be developed. Children naturally have the ability to develop their potential. This ability is obtained by children through the experience of associating with people in their environment, whether parents, siblings, peers, or other adults. Early experiences of hanging out with their environment can be obtained by children from an early age. Early childhood is a child who is in the age range of 0 years from birth to the age of 6 years.¹,²

The early period (0-6 years) becomes a sensitive period that is the period of physical and psychological maturation functions that are ready to respond to the stimulation provided by the environment. This period is a time to study physical, cognitive, language, social-emotional, self-concept, discipline, independence, art, morals, and religious values.³ Basically, the world of children is identical with playing, especially at an early time. Through games, children experience the learning processes.³

One place for children’s education or kindergarten (TK) which has a children’s play area as a means of learning is Immanuel Kindergarten Batu City. This kindergarten has an outdoor children’s play area with various playground equipment such as swings, slides, and globe climbing. During breaks, the children are very active in trying various games that require physical ability in the play area. However, children’s playground equipment and the playing environment can pose a great risk if not carefully designed and maintained. Based on preliminary studies conducted at Immanuel Kindergarten Batu City, there were several accidents experienced by children while playing in the playground. The following is data about accidents during play experienced by children recorded within 1 month based on the results of interviews with TK Immanuel teachers, namely 40%
crashing a friend, 33% stumble, 20% crashing into a game tool, 7% falling from a game tool.

Management of children’s play area needs to be considered so that it can provide benefits to playing with children. In addition, good management of various aspects such as game tools, playing methods, supervision, and the playing environment can also reduce accidents while playing. Therefore, the design and construction of children’s playgrounds in schools, especially kindergartens require emphasis on security and comfort aspects to ensure their level of safety.4,5

**METHOD**

**Time and Place**

Study about the evaluation of playground in kindergarten takes a place in Immanuel Kindergarten. This study was conducted during June-August 2018.

**Data Collection**

Data collection was done by collecting primary data and secondary data. Primary data in the study were collected through observation of play activities and children’s behavior. Then do an evaluation by filling in the checklist of a good playground. Data related to accidents while playing and safety culture while playing for children were also conducted by interviewing several accompanying teachers who accompanied the children while playing. Secondary data that used in this research is the standard data on a good playground.

**Data Processing Method**

Based on the results that have been obtained, data processing is carried out through comparative studies with dependent sample t-test by comparing the standards of good playgrounds with observations obtained directly from observations in the field, as well as secondary data obtained through supporting studies. In addition, an analysis was carried out using a causal diagram and formulation of strategies to correct problems with the SWOT method.

**RESULT AND DISCUSSION**

**Physical Conditions of Playground**

One of the things that need to be considered in the management of the playground is the condition of the environment where children play. This can be in the form of the physical condition of the land and building play, or the condition of outdoor playground equipment that is in the playground. The playground at Immanuel Kindergarten has an area of approximately 40 m² with a variety of game tools namely climbing the globe, swings, seesaw, as well as a number of agility rides where students will face obstacles such as climbing, bowing through holes, and so on.

The children’s playground in Immanuel Kindergarten generally has a relatively narrow place so that children who play and run are very likely to collide with other children. In addition, there are several holes on the surface of the playground that cause the possibility of a child falling because of the hole. However, the children’s playground has a guardrail made of iron fences and hedgerows so that the children keep playing in the place provided and affordable by the teacher’s supervision.

**Safety Culture**

The culture of child safety when playing is an important thing that must be introduced to children so that children can use the facility to play properly and not to engage themselves or others. During playing, all students of Immanuel Kindergarten were always accompanied by several teachers, so that the children were still under surveillance. Teachers of Immanuel Kindergarten carry out controlling functions so that children keep playing safely and preventing accidents. However, there are still children who have a tendency to endanger themselves while playing. Here are some examples of cases of misuse of play facilities performed by children:

One of the students climbed the stairs not through the steps, but through the ladder barrier which should be used to hold hands so as not to fall. This can endanger the child because with the position of the body as shown below, the child easily loses balance and allows an accident to fall from the playground.

Some students are seen standing in the swings and handrails, so that when a swing moves it can cause children to lose balance.

Based on the results of interviews with the teachers of Immanuel Kindergarten, children are always reminded when using the game but not in accordance with the actual way of use. There is no specific overview for children about the available play facilities and how to
play, so children are free to explore the usefulness of the tool. But every resting hour and the child is free to play in the outdoor area, each teacher has informed students to be careful in playing.

**Comparative Study**

The comparative study was conducted to evaluate the place of play of observation objects with a good standard of the playground, and analyze the causes of various aspects so that further steps can be identified.

Comparison of Playgrounds Immanuel Kindergarten with the Standards

This comparative study was carried out using the student-t test to compare whether there was a difference between the object’s playground and the predetermined standard. The actual situation in Immanuel Kindergarten is perceived value, which is an assessment of the observations perceived by observers. While the standard playground is the expected value. This assessment uses an interval scale of 1-3 with successive provisions that are not appropriate, appropriate, and very appropriate. After getting perceived and expected values, the gap or difference between the two is calculated by subtracting the expected value from the perceived value.

**Table 1. Comparative Value of Playground in Immanuel Kindergarten with Standards**

<table>
<thead>
<tr>
<th>No.</th>
<th>Aspects</th>
<th>Perceived</th>
<th>Expected (Standard)</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Equipment and play areas do not have the following: sharp points or angles; splinters or protrusions that might catch children’s clothing; peeling paint; loose or rusty parts; small parts that can be released or present the danger of suffocation, aspiration, or consumption; danger of strangulation; components that can tear the skin, pinch, thin, or destroy body tissues.</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>To prevent the trap of the head or limbs of children, all openings while playing or other equipment are too large for the child’s head or limbs to be trapped or too small to be inserted into the child’s body.</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>To prevent finger traps, openings are smaller than 3/8 inches or larger than 1 inch.</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4.</td>
<td>Other toys and equipment used in and around the water play area are made of solid plastic or metal. No one uses glass material.</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Children do not play in areas where there are water bodies including tubs, buckets, washbasins, toilets, swimming pools, pools, irrigation canals, or installed wading pools, unless adults watching are within arms that provide a touch of supervision.</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>There is no danger of tripping</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>There is no danger of being hit by goods</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>8.</td>
<td>Hazardous equipment are not available or cannot be accessed by children using barriers such as fences.</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>Children wear hats or hats in full to protect their faces from the sun if they are not in a shady place.</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>10.</td>
<td>Physical activity / outdoor time is not taken as a punishment.</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>11.</td>
<td>Caregiver / Teacher uses simple rules for behavior that children can understand. They use clear, direct and simple commands, and descriptive praise.</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td>Caregivers / Teachers encourage positive behavior, promote self-regulation, and model desired behavior.</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>13.</td>
<td>Caregivers / Teachers support children in learning appropriate social skills and emotional responses as well as providing predictable daily routines and schedules.</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>
In determining whether there is a difference between the object of observation and the standard, the t-test is carried out by setting the significance level or alpha of 5%. \( H_0 \) shows that there is no difference between the object of observation and the standard, while \( H_1 \) shows the difference between the object of observation and the standard used.

Based on these results, it is known that the sig value is 0.003 < 0.05, so \( H_0 \) is rejected. This means that overall, there are differences between the object of observation and the standard. This difference can occur, among others, because there are some things that are not in accordance with the standard of the playground.

Improvements can be made by improving aspects that have a large gap between perceived, and expected. The biggest gap is worth 3, namely in the aspect of no tripping danger and aspects of the use of hats in outdoor activities. Here are examples that are suitable for amusement park improvements:6,7

The use of pedestal playgrounds that are safe and flat like carpets or fine sand, so there are no holes that can make a child trip.

Use a hat or head protection when children play in an open area so that children are protected.

Table 2. Table Matrix IFE and EFE

<table>
<thead>
<tr>
<th>Strength</th>
<th>Weight</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1. The game facilities that are owned are quite varied, among others, a vehicle for agility, swings, globe climbing and slide.</td>
<td>0.2</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td>No. 2. There are teachers who accompany children every play.</td>
<td>0.2</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0.4</td>
<td></td>
<td>1.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weakness</th>
<th>Weight</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1. Lack of information about how to play</td>
<td>0.2</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>No. 2. Lack of debriefing on children regarding safety in playing</td>
<td>0.1</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>No. 3. The playing environment is too narrow</td>
<td>0.1</td>
<td>2</td>
<td>0.2</td>
</tr>
<tr>
<td>No. 4. The base for playing hard and hollow</td>
<td>0.2</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0.4</td>
<td></td>
<td>1.3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1</td>
<td></td>
<td>2.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Weight</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1. Game facilities that are owned can increase children’s agility and motor power</td>
<td>0.5</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0.5</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>
Based on the analysis in the IFE matrix, the strength factor has a total score of 1.4, and the weakness factor has a total score of 1.3. The results of the EFE matrix indicate the opportunity factor has a score of 2, while the threat factor has a value of 1.5. Then it is known that the strength value above the weakness value, with the difference (+) 0.1 and the opportunity value above the threat value with the difference (+) 0.5. From the results of the identification of these factors it can be described in the SWOT Cartesian Diagram

From the SWOT diagram, the playground at Immanuel Kindergarten is in quadrant 1, which is aggressive. Being in quadrant I is a very favorable situation, because the Immanuel Kindergarten playground has the opportunity and strength so that it can take advantage of the opportunities that exist. The strategy that must be applied in this condition is to support aggressive growth policies (Growth Oriented Strategy).

The explanation of strategic planning can be described below:

Strength: The game facilities that are owned are quite varied, among others, a vehicle for agility, swing, globe climbing and slide, there are teachers who accompany children every play.

Weakness: Lack of information about how to play, lack of debriefing on children regarding safety in playing, the playing environment is too narrow, the base for playing hard and hollow.

Opportunity: Game facilities that are owned can increase children’s agility and motor power.

SO Strategy: Using strength to utilize opportunity=3.4, manage game facilities to increase children’s motor power, the teacher gives play instructions and helps students optimize their physical condition to improve motor skills

WO Strategy: Minimize weakness to utilize opportunity=3.3, provide information about how to play, provide information related to safety in playing, expand the playground so that it can add games that increase child agility, improve the playground so that it doesn’t cause accidents.

ST Strategy: Using strength to overcome threats=2.9, maintain the feasibility of playing equipment, give instructions on how to play so as not to damage the game.

WT Strategy: Minimize weakness to avoid threats=2.8, optimize available land and choose a safe place to play.

CONCLUSIONS

The playing environment tends to be narrow and hollow, causing several accidents, including colliding and tripping. Children do not fully understand the safety of playing so that there are still children who have the potential to cause accidents. In general, there are differences between playgrounds at Immanuel Kindergarten and playground standards (sig. 0.03 <0.05). The biggest difference lies in the aspect of no tripping danger and aspects of the use of hats on outdoor activities caused by several factors including human, method, equipment, and environment. Proposed suggested improvements refer to the strategy that is most likely to be implemented, namely the SO strategy to provide prior knowledge to children before playing, and manage play facilities.
Ethical Clearance: Not required

Source of Funding: Self funding

Conflict of Interest: There is no conflict of interest exist.

REFERENCES


Correlation Tuberculosis Drugs Treatment Phase with SGPT/ Bilirubin Total Level and Correlation both of the Enzymes from TB Patients

Anny Thuraidah¹, Jihan Rahmah Naily¹, Nadiya Uswatun Hasanah¹, Leka Lutpiatina¹
¹Medical Laboratory Technology Politekkes Kemenkes Banjarmasin, Mistar Cokrokusumo Street 4a Banjarbaru Indonesia

ABSTRACT
Tuberculosis (TB) is a disease caused by Mycobacterium tuberculosis that can infect some organs of the body such as lungs, kidneys, and bones. Multidrug therapy method using Isoniazid, Rifampicin, Ethambutol, Pyrazinamide, and Streptomycin. Anti Tuberculosis Drugs (ATD) have side effects on the liver, skin, and nerves. Unwanted one is hepatotoxic. This research aims to determine correlation long of ATD administration with total Bilirubin and SGPT level from pulmonary TB patients at Sungai Tabuk 1, and Martapura Barat PHC also determines a correlation between the Total Bilirubin with the SGPT. 25 people as the sample with accidental sampling technique. This research is the analytic survey with cross-sectional study design. The results is 1.36 mg / dL for 0-2 months, 3-4 months were 1.19 mg / dL, and 5-6 months 1.13 mg / dL for mean of Total Bilirubin and 30,58 u/l, 19,83 u/l dan 15,16 u/l for mean SGPT level. Spearman test is p 0,001 for Bilirubin ; 0,002 for SGPT with duration ATD administration and 0,000 between those enzymes. A conclusion is there is the significant correlation between duration of administration ATD with total Bilirubin (-0,632) and SGPT (-0,597) While the decrease of level value from both enzymes had the strong correlation (0,972). Recommended for further research to the same respondents with another ATD.

Keywords: ATD; Treatment Phase; SGPT; Total Bilirubin

INTRODUCTION
Pulmonary tuberculosis (TB) is a disease caused by the bacteria Mycobacterium tuberculosis which transmitted through the air, usually attacks the lungs but can also attack other organs of the body¹. Pulmonary tuberculosis is a chronic disease that is still a health problem in the world, including in Indonesia. Six countries accounted for 60% of new tuberculosis cases, namely India, Indonesia, China, Nigeria, Pakistan, and South Africa.

According to Indonesian health profile data and information in 2016, the number of new tuberculosis cases was 156,723 cases whereas South Kalimantan ranked 22nd at 2,811 cases consisting of 1,733 men and 1,078 women. The number of tuberculosis cases is possible because of problems in the health center, including patient noncompliance for treatment and low quality of sputum collected by patients for examination². Annual report on Sungai Tabuk 1 and Martapura Barat Health Center in 2016 pulmonary tuberculosis (TB) cases ranked first for infectious disease cases. Since 1995, Indonesia has adopted a WHO-recommended treatment strategy, namely the Directly Observed Treatment Shortcourse (DOTS) strategy. The implementation of the DOTS strategy is proven to reduce tuberculosis mortality³.

The minimum treatment for tuberculosis for six months with 2 phases namely intensive phase is the initial treatment phase is detected until the second month, and the continuous phase is the treatment phase after the intense period of the 3rd month until the 6th month completed. General therapy is given Isoniazid, Rifampicin, Ethambutol, Pyrazinamide, and Streptomycin. Anti-tuberculosis drugs (ATD) have side effects on the liver, skin, nerves and can cause gastrointestinal. The severe impact that is currently in focus is the effect of anti-tuberculosis drugs on the liver, which causes hepatotoxic, known as Antituberculosis Drug-induced Hepatotoxicity (ATDH)⁴.
This is because of the liver functions as the center of a metabolic disposition of all drugs and foreign substances in the body. In the liver, the medication is changed to be more hydrophilic, so it can dissolve in water and can excrete in urine or bile. The resulting liver traces have a direct effect, namely by producing enzyme-drug complexes. This complex will then cause cell dysfunction, membrane dysfunction, and T cell cytotoxic response.

Tests that can be done to assess hepatotoxic liver function include measurement of serum bilirubin levels, aminotransferase or transaminase, alkaline phosphatase, Gamma GT, and albumin. The progressive increase in SGPT and Bilirubin levels is very dangerous. Continuous improvement will result in drug-induced hepatitis. When drug-induced hepatitis occurs, the treatment must be stopped, if it occurs in the intensive phase, after the normal SGPT level returns, the treatment is continued with the same drug unless pyrazinamide is replaced with streptomycin. But if it occurs in the advanced phase, after the normal SGPT level returns, the treatment is continued with the same drug, Isoniazid, and Rifampisin. Pyrazinamide should not be given to patients with the abnormal liver function if the patient in the intensive phase has the abnormal liver function.

In the previous study by Pramastuti out of 27 patients, there was an increase in SGPT of 22 people.

Another supportive study was a study conducted by Khadka, out of 114 patients 92 patients had elevated SGPT within normal limits, and 22 patients had elevated SGPT above the normal limit. While the increase in bilirubin levels is used as a specific indicator of hepatic impairment, which can be fatal if not treated early. Besides that, there is an association between the increase in SGPT with Bilirubin in patients with Hepatitis C. From the description of the previous background to find out the hepatotoxic effect of Anti Tuberculosis (ATD) drugs, a study was conducted to determine the relationship of the duration of Anti Tuberculosis (ATD) treatment to SGPT levels and Bilirubin and to determine the relationship of decreased SGPT levels with Bilirubin pulmonary tuberculosis patients.

MATERIALS AND METHOD

The study is an Analytical Survey with a Cross-Sectional design. The study sample was 25 patients with pulmonary tuberculosis category I on intensive phase treatment and advanced phase at Sungai Tabuk 1 Community Health Center and West Martapura Community Health Center. Sampling technique Accidental sampling with criteria for pulmonary TB patients over 18 years with regular treatment. The equipment used by Pharma 08 photometer, Randox RX Monza photometer. Reagents used from the biosystem.

RESULTS AND DISCUSSION

Table 1. Results of measurement of SGPT levels and total bilirubin

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Giving medicine 0-2 months</th>
<th>Giving medicine 3-4 months</th>
<th>Giving medicine 5-6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SGPT (u/l)</td>
<td>Bilirubin (mg/dl)</td>
<td>SGPT (u/l)</td>
</tr>
<tr>
<td>1</td>
<td>49,5</td>
<td>A 1.77</td>
<td>A 23</td>
</tr>
<tr>
<td>2</td>
<td>23,5</td>
<td>N 1.28</td>
<td>A 26</td>
</tr>
<tr>
<td>3</td>
<td>19,5</td>
<td>N 1.21</td>
<td>A 19</td>
</tr>
<tr>
<td>4</td>
<td>36,5</td>
<td>A 1.40</td>
<td>A 21,5</td>
</tr>
<tr>
<td>5</td>
<td>45,5</td>
<td>A 1.37</td>
<td>A 15,25</td>
</tr>
<tr>
<td>6</td>
<td>22</td>
<td>N 1.23</td>
<td>A 14,25</td>
</tr>
<tr>
<td>7</td>
<td>34,5</td>
<td>N 1.36</td>
<td>A</td>
</tr>
<tr>
<td>8</td>
<td>17</td>
<td>N 1.2</td>
<td>A</td>
</tr>
<tr>
<td>9</td>
<td>34,5</td>
<td>N 1.52</td>
<td>A</td>
</tr>
<tr>
<td>10</td>
<td>23,25</td>
<td>N 1.28</td>
<td>A</td>
</tr>
<tr>
<td>Average</td>
<td>30,58</td>
<td>1.35</td>
<td>19,83</td>
</tr>
</tbody>
</table>

Description: N = Normal, A = abnormal Bilirubin Total (N: 1.0 mg / dL, A:> 1.0 mg / dL) SGPT (N: 0-29 U / L, A ≥ 29 U / L)
Table 2. Respondents’ length of work

<table>
<thead>
<tr>
<th>Treatmen Phase</th>
<th>Long of work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 8 hr</td>
</tr>
<tr>
<td>0-2 months</td>
<td>60,0</td>
</tr>
<tr>
<td>3-4 months</td>
<td>30,0</td>
</tr>
<tr>
<td>5-6 months</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3. Respondents’ sleep duration

<table>
<thead>
<tr>
<th>Treatmen Phase</th>
<th>Long of Sleep</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 6 hr</td>
</tr>
<tr>
<td>0-2 months</td>
<td>10,0</td>
</tr>
<tr>
<td>3-4 months</td>
<td>-</td>
</tr>
<tr>
<td>5-6 months</td>
<td>22,2</td>
</tr>
</tbody>
</table>

Table 4. Respondents’ smoking habits

<table>
<thead>
<tr>
<th>Treatmen phase</th>
<th>Smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>0-2 months</td>
<td>30,0</td>
</tr>
<tr>
<td>3-4 months</td>
<td>33,3</td>
</tr>
<tr>
<td>5-6 months</td>
<td>44,4</td>
</tr>
</tbody>
</table>

DATA ANALYSIS RESULTS

Table 5. Results of statistical analysis

<table>
<thead>
<tr>
<th>Test statistics</th>
<th>Long ATD with SGPT</th>
<th>Long ATD with Bilirubin Total</th>
<th>SGPT with Bilirubin Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>p</td>
<td>Koeff korelasi</td>
<td>p</td>
</tr>
<tr>
<td>Normality</td>
<td>0,010</td>
<td>-</td>
<td>0,022</td>
</tr>
<tr>
<td>Spearman</td>
<td>0,002</td>
<td>-0,597</td>
<td>0,001</td>
</tr>
</tbody>
</table>
Single-dose Rifampicin can interfere with excretion of bilirubin so that it can increase unconjugated bilirubin which causes real or subclinical jaundice, without accompanied hepatocellular damage. This can be temporary and will occur early in patients with previous liver abnormalities\textsuperscript{11}. Rifampicin also increases INH metabolism into isonicotinic acid and hydrazine, both of which are hepatotoxic. The half-life of plasma AcHz (Acetyl Hydrazine) which is a metabolite of INH shortened by Rifampicin and AcHz rapidly converted into its active metabolite by increasing the rate of oxidative elimination from AcHz, which is related to the high incidence of liver necrosis caused by INH and Rifampicin in combination\textsuperscript{12}.

On examination of SGPT levels in intensive phase treatment, 5 samples with SGPT levels exceeded normal values because pulmonary tuberculosis patients experienced the highest increase in transaminase enzymes in the fourth week to the sixth week after administration of ATD\textsuperscript{13}. This was due to intensive treatment with four types of anti-tuberculosis drugs, namely Isoniazid, Rifampicin, Pyrazinamide and Ethambutol are consumed every day for two months of treatment\textsuperscript{14}. And the incidence of hepatotoxicity was higher in patients with latent tuberculosis infection who received combination therapy with Rifampicin and Pyrazinamide compared with patients who only given Isoniazid\textsuperscript{15}.

Isoniazid inhibits CYP1A2 gene function which functions to detoxify hydrazine, where hydrazine is an isoniazid metabolite which, if further metabolized by cytochrome P450 will produce a product that causes hepatotoxic. While the pyrazinamide toxicity mechanism is unknown, according to case studies in mice, pyrazinamide inhibits the activity of several CYP450.12 And the metabolism of Rifampin starts from acetylated rifampicin to acetylation, then hydrolyzed to 3-formyl rifampicin\textsuperscript{11}.

In addition to factors from consumption of ATD, SGPT levels exceeding normal values can also be caused by various factors. Based on the results of the questionnaire submitted, all patients on intensive phase treatment who had SGPT levels exceeding normal values were in the age range of 40 to 65 years. This is consistent with Clarasanti’s study, with samples with high levels of transaminase enzymes after ATD therapy at most in the 41-50 year age group of 16 people\textsuperscript{16}.

Also, 2 out of 5 patients who have SGPT levels exceeding normal values are active smokers. Smoking causes lipid peroxidation which causes damage to normal cell membranes from the liver. If liver cell damage occurs, there will be an increase in SGPT and SGOT in smokers compared to nonsmokers\textsuperscript{17}. Smoking and shortness of breath also affect the increase in bilirubin levels in line with Lavigne’s research results Smoking worsens the condition of pulmonary TB patients. Shortness of breath causes reduced oxygen intake which affects the decrease in oxygen in the body. Lack of oxygen is harmful to the body because it can damage organs such as the liver which plays a very important role in removing toxic substances\textsuperscript{24}.

Based on the results of examination of SGPT levels in the intensive phase it can be seen that SGPT levels were only 1.5 times higher than normal. Treatment does not need to be stopped if the increase in SGPT levels is less than three times, only to strictly monitor the liver function of the patient while undergoing treatment.7 ATD hepatotoxicity does not occur in every patient but can cause extensive and permanent liver injury and can cause death if not detected at the initial stage\textsuperscript{18}.

All results in the advanced phase of 3-4 months and eight patients in the advanced phase 5-6 months had normal SGPT levels. Because the type of ATD given in that phase only consists of Isoniazid and Rifampicin and is only consumed three times a week for four months of treatment\textsuperscript{14}. And how to administer ATD 3 times per week compared to each day has little impact on the occurrence of hepatotoxicity\textsuperscript{15}.

In the advanced phase of 5-6 months, there is 1 sample that has SGPT levels exceeding normal values. Hepatic reactions usually appear during the first two months of treatment but can appear at any time during the treatment period\textsuperscript{16}. And this can occur due to hypersensitivity reactions in susceptible individuals.

Increased bilirubin levels only occur in the first two and three months of ATD therapy. This is because in the first and second months an intensive phase of ATD administration, giving four treatment regimens at once for two months. This is due to the inhibition of bile synthesis and excretion of bile acids and bilirubin and cholesterol in bile\textsuperscript{20}.

Based on the questionnaire submitted the patient worked more than 8 hours and had less than 8 hours of
sleep, which caused a lack of rest time. Poor sleep is also the main cause of liver cirrhosis because the body’s system requires enough hours for the detoxification process. Like Pramudiantoro’s statement that there are several factors that can increase SGPT levels are insufficient rest, too tired and consumption of drugs.24

Bilirubin is the final breakdown product of heme (hemoglobin), increased in liver cell damage and cholestasis.10 Increased destruction of erythrocytes that are not matched by the speed of conjugation and secretary of bile flow resulting in increased bilirubin levels, and conjugated bilirubin cannot escape the bile to the intestine so will re-enter and be absorbed into the bloodstream, elimination is less due to the presence of bile duct obstruction or problems in processing bilirubin.21,22 Bilirubin levels that are above normal values are also influenced by several factors including hemolytic anemia which is a toxic effect from isoniazid and rifampicin.20,12 Thuraidah A, et al 2017 states that there is a long relationship between consumption of anti-tuberculosis drugs and anemia.25

CONCLUSION

The conclusion of this study is that there is a significant relationship between the duration of use of anti-tuberculosis drugs with total bilirubin levels (p = 0.001 <α) and SGPT (p = 0.002 <α) with a correlation value of -0.632 for Bilirubin Total and -0.597 for SGPT, which states the relationship is moderately correlated and the longer the use of the drug levels are getting lower. While the significant relationship between the decrease in total bilirubin levels and SGPT has a strong correlation (0.972).

Ethical Clearance: Taken From Health Research Ethics Committee Politeknik Kesehatan Banjarmasin

Conflict of Interest: Nil

Source of Funding: Self

REFERENCES

2. Lutpiatina L, Wahidah, Nurhilaliah, D Rakhmina, Rifqoh. Sputum Quality Of The Anytime And Outset For Examination Acid-Resistance Bacilli, Medical Laboratory Technology Journal. 2018; 4 (1), 26-29
4. Pramastuti, I. The Relationship Between Giving Anti-Tuberculosis Medication and Transaminase Enzyme Levels in Tuberculosis Patients in New Cases at Temanggung Hospital, Faculty of Medicine, Sebelas Maret University, Surakarta; 2011
7. PDPI. Guidelines for Diagnosis and Management of Tuberculosis in Indonesia 2011; Jakarta; 2011
10. Aleya dan KN Berawi. Correlation of SGOT/SGPT with Bilirubin levels in Hepatitis C patients in Dr.H.Abdul Moeloek Hospital, Majority. 2014;4(9)
13. Praditya EP. Clinical Profile of Hepatitis Patients Affected by Anti-tuberculosis Drugs at Siti Hajar Hospital Medan tahun 2012: Medan; 2015


18. Govindan, N. The incidence of Hepatotoxicity in pulmonary tuberculosis patients using first-line anti-tuberculosis drugs at Adam Malik Haji Hospital in 2010, University of Northern Sumatra; Medan; 2011


24. Pramudiantoro, E. Relationship of Sleep Rest with Levels of SGOT / SGPT in Hepatitis Patients in the Inpatient Room of Kraton Hospital in Pekalongan Regency, Faculty of Nursing and Health Sciences University of Muhammadiyah Semarang; Semarang; 2013

An Environmental Health Risk Assessment of Workers’ Ambient Exposure to Particulate Matter of 2.5 Microns or Less at a Concrete Batching Plant

Katania Rosela Putri1, Umar Fahmi Achmadi1, Ririn Arminsih1, Doni Hikmat Ramdhani2

1Dept. of Environmental Health, Faculty of Public Health, Universitas Indonesia,
2Dept. of Occupational Health and Safety, Faculty of Public Health, Universitas Indonesia

ABSTRACT

Background. Workers in the concrete industry can be negatively affected by exposure to particulate matter. Particulate matter that is 2.5 microns in width or less (PM_{2.5}) is one of the most dangerous air pollutants because it can be inhaled into the lungs and enter the bloodstream. Objective. This research analyzed workers’ health risks due to inhalation exposure to PM_{2.5} at a concrete batching plant. Materials & Method. The risk was calculated using an environmental health risk assessment method to determine the value of the risk quotient (RQ). The RQ was obtained by dividing the body exposure intake by the reference concentration. If the value of RQ>1, then risk management is necessary. This study calculated the risk of PM_{2.5} exposure for 59 workers. Samples were collected at 4 points in the plant for 1 hour using a high-volume air sampler; each point was sampled 2 times, once during the day and once at night. Results. The average concentration of PM_{2.5} was 120 mg/m^3 that means the concentration was above the quality standard. The calculation shows that PM_{2.5} is risky to workers in life time duration (25 years) with the average yield at least for the next 9 years because reach RQ=1,096. Thus, risk management is required for the next 25 years by reducing PM_{2.5} concentration.

KEYWORDS: PM_{2.5}, Concrete Batching Plant, Environmental Health Risk Assessment

BACKGROUND

Fine particle or PM_{2.5} is one indicator of air pollution. Particulate matter consists of a complex mixture of solid and liquid particles of organic and inorganic substances suspended in the air. Tracheobronchial penetration of PM is related to particle size and efficiency of the lung defense mechanism. Particles smaller than 10 micron cause larger problem, because these particles can enter the lungs and then enter the alveoli into the bloodstream Exposure of PM_{2.5} can cause acute and chronic effects. WHO estimates that around 7 million people die every year from exposure to fine particles in polluted air that penetrate deep into the lungs and cardiovascular system, causing diseases including stroke, heart disease, lung cancer, chronic obstructive pulmonary diseases and respiratory infections, including pneumonia. These fine particles can penetrate deep into the lungs and then irritate and damage alveolar wall, it will interfere lung function which clinically causes coughing, shortness of breath, and increased risk of Chronic obstructive pulmonary disease (COPD) associated with impaired lung function.

The source of PM_{2.5} pollution from industrial activities are usually comes from mining activities, factory chimneys, burning products and the cement industries. Batching Plant is a factory that ready mix concrete in accordance with the mix design that is ordered by the contractor who is doing construction. Ready mix concrete basically consists of water, cement, fine aggregate and coarse aggregate. Ready mix concrete components include calcium, silica, aluminum,
magnesium, iron oxide and sulfur dioxide compounds along with fly ash, fine aggregates, coarse aggregates and admixture. These materials are source of PM$_{2.5}$ pollution.$^5,15$

The objective of this study was to assess the level of non-carcinogenic health risks caused by workers’ inhalation exposure to PM$_{2.5}$ in ambient air at a concrete batching plant. The ultimate goal was to formulate a risk management recommendation. Previous environmental health risk assessments (EHRAs) have been conducted to pinpoint where PM$_{2.5}$ exposure affects people working in the cement industry, and they have said that the most considerable risk is in areas closest to pollutant sources$^3$

**MATERIALS AND METHOD**

The method used in this study is the EHRA, which consists of several steps: (1) hazard identification, (2) exposure assessment, (3) dose-response analysis, and (4) risk characterization.$^{14,17}$ Two kinds of samples were used as variables in the risk assessment. The first sampling technique is interviewed workers to know the activity and anthropometric characteristics. The second technique was the use of a high-volume air sampler to measure the PM$_{2.5}$ concentrations in the ambient air at the batching plant. The short-term sampling method was used in which samples are collected for 1 hour. The research sample consisted of 59 workers as respondents while the criteria for including each respondent were as follows: (1) a permanent worker in the plant, (2) 18-55 years old when the samples were taken, and (3) a worker in an outdoor area. PM$_{2.5}$ samples were taken at 4 points in outdoor areas and were collected 2 times at each location, once during the day and once at night. The chronic daily intake (CDI) of PM$_{2.5}$ was calculated using the following equation$^{14}$:

\[
CDI = \text{Chronic Daily Intake (mg/kg/day)},
\]

\[
C = \text{Concentration of risk agent (mg/L for drinking water and mg/kg for food)},
\]

\[
R = \text{Rate of intake or consumption (L/day for drinking water and kg/day for food)},
\]

\[
t_e = \text{Time of exposure (hours/day)},
\]

\[
f_e = \text{Frequency of annual exposure (day/year)},
\]

\[
Dt = \text{Duration of exposure, year (real time or projection, 30 years for residential default value)},
\]

\[
W_b = \text{Weight (kg)},
\]

\[
t_{avg} = \text{Average time period (Dt x 365 days per year for non-carcinogenic substances, 70 years x 365 days per year for carcinogenic substances)}.
\]

Estimation of the level of health risks derived from calculations using Risk Quotient (RQ) is calculated through the equation$^{14}$:

\[
CDI = \text{Intake (mg/kg/day)}
\]

\[
RfC = \text{Reference Concentration (mg/kg/day)}
\]

**RESULT**

Hazard Identification. The risk agent in this study is the exposure of PM$_{2.5}$ toward respiration of human body. The highest concentration location for PM$_{2.5}$ exposure is located in the stockpile area during the morning shift which is 137.2µg/m$^3$, and the lowest is in the silo and parking lot during the morning shift which is 107.5µg/m$^3$. The average concentration per day of PM$_{2.5}$ is 120µg/m$^3$ (Table 1).

**Table 1. Concentration of PM$_{2.5}$ on 4 points in Batching Plant**

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Measurement Time</th>
<th>Concentration (µg/m$^3$)</th>
<th>Average concentration per day (µg/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stockpile Area</td>
<td>09.15-10.15</td>
<td>137,2</td>
<td>129.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21.10-22.10</td>
<td>120,9</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Central Mix &amp; Conveyor</td>
<td>14.40-15.40</td>
<td>133,5</td>
<td>117.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20.00-21.00</td>
<td>101,4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Lab, Workshop, &amp; Waste Treatment</td>
<td>11.10-12.10</td>
<td>114,4</td>
<td>113.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21.10-22.10</td>
<td>112,3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Silo &amp; Parking Lot</td>
<td>15.00-16.00</td>
<td>107,5</td>
<td>120.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20.00-21.00</td>
<td>133,1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>120</td>
</tr>
</tbody>
</table>
**Exposure Assessment.** Weight measurement and worker activity patterns aim to determine PM$_{2.5}$ exposure to workers in the Batching Plant. Variables that need to be known from the worker activity to calculate the intake are in Table 3. The Frequency of Exposure ($f_E$) aims to find out the number of working days of workers for one year. Every worker has a 12-day leave per year. The working day of workers in outdoor is 9 per 10 days, so the working days per year multiplied by 365 days is 329 days/year, then minus the days of leave, so total frequency of exposure is 317 days/year.

The duration of Real Time Exposure is based on the actual time conditions of all respondents, but workers can work in the Batching Plant until their retirement and are constantly exposed to PM$_{2.5}$ exposure. Therefore, it is necessary to calculate the Duration of Life Time Exposure ($D_{\text{life time}}$) with an EPA default value for industry which is 25 years.

The average time period ($t_{\text{avg}}$) is the average time of year the workers working at the Batching Plant. To find out the value by calculating the duration of exposure multiplied by the number of days per year which is 365 days/year for non-carcinogenic exposure ($D_t \times 365$ days/year for non-carcinogenic substances). The calculation is:

\[ T_{\text{avg}} = D_t \times 365 \text{ days/year} \]
\[ T_{\text{avg}} = 25 \text{ year } \times 365 \text{ days/year} \]
\[ T_{\text{avg}} = 9.125 \text{ days/year} \]

Based on the results of the data retrieval, it was found that these Batching Plants have a concentration of PM$_{2.5}$ of 0.12mg/m$^3$ with the average body weight of the worker 66.83kg and the inhalation rate 0.64m$^3$/hour, based on the activity pattern of working for 12 hours per day for 317 days per year with the average worker working for 2 years (Table 2), based on the calculation of the formula for the intake value which is $0.0016 \text{ mg/kg/day}$. The calculation of lifetime intake produces a value of $0.0124 \text{ mg/kg/day}$.

**Table 2. Distribution of Anthropometry and Activity Patter of Respondent**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
<th>Normality Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>33.83</td>
<td>33</td>
<td>20</td>
<td>53</td>
<td>Normal</td>
</tr>
<tr>
<td>Weight (Kg)</td>
<td>66.83</td>
<td>65.00</td>
<td>41</td>
<td>101</td>
<td>Normal</td>
</tr>
<tr>
<td>Inhalation Rate (m$^3$/day)</td>
<td>0.6361</td>
<td>0.63</td>
<td>0.53</td>
<td>0.73</td>
<td>Normal</td>
</tr>
<tr>
<td>Time of Exposure (hour/day)</td>
<td>12,2669</td>
<td>12.5</td>
<td>9</td>
<td>15</td>
<td>Normal</td>
</tr>
<tr>
<td>Duration of Exposure Real time (year)</td>
<td>3,3153</td>
<td>2</td>
<td>3 month</td>
<td>16</td>
<td>Abnormal</td>
</tr>
</tbody>
</table>

**Dose-Response Analysis.** The purpose of the Dose-Response Analysis in this study is to calculate the Reference Concentration ($R_f C$) with the intake calculation and the value in safe limits that do not cause detrimental effects on workers. The calculation value of $R_f C$ is .

**Risk Quotient.** The Risk characterization is calculated to determine the level of risk for workers exposed to PM$_{2.5}$. If the value is $RQ < 1$ then exposure is not risky, whereas if the value is $RQ > 1$ it is considered risky exposure. The calculation of the total risk of Batching Plant with real time duration using the same equation produces $RQ = 0.412$ meaning that PM$_{2.5}$ exposure is not at risk in the Batching Plant with real time exposure duration. Based on the calculation of the life time duration, the risk has begun since the worker has worked for 9 years because the value of $RQ > 1$ is equal to 1.096. (Table 3). The result of $RQ$ value shows risk, then the exposure with the life time duration requires risk management.
Table 3. Risk Projection

<table>
<thead>
<tr>
<th>Duration</th>
<th>2 years</th>
<th>5 years</th>
<th>9 years</th>
<th>15 years</th>
<th>20 years</th>
<th>25 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.412</td>
<td>0.609</td>
<td>1.096</td>
<td>1.826</td>
<td>2.435</td>
<td>3.044</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The calculation of environmental health risk assessment of PM$_{2.5}$ exposure to Batching Plant workers shows that PM$_{2.5}$ is not a risk to workers for the duration of real time exposure, but it is risky to workers in the duration of lifetime exposure. Data regarding worker characteristics, anthropometric factors, and activity patterns are required to determine the amount of risk that individuals are exposed to at certain PM$_{2.5}$ concentrations. The results of the univariate analysis regarding the characteristics of respondents show that the average age of workers at the Batching Plant is 34 years old. Based on the research about the association between PM$_{2.5}$ exposure and impaired lung function, the human respiratory system stalls to 80% in late adolescence, which is 18 years old for women and 20 years old for men. During its development, the lungs can experience modification and damage that are at risk for experiencing respiratory diseases during adulthood. After achieving optimal lung function, the advancing age will affect the decline in lung function to reach 28 ml per year. Thus, the advancing age will increase the risk of respiratory health.$^{10}$

The average concentration (C) of PM$_{2.5}$ at the Batching Plant in 4 sampling points during days and nights is 120 μg/m$^3$. The measurement results show that in every point of sampling the concentration of PM$_{2.5}$ passes the limit value. The permissible concentration of PM$_{2.5}$ within 24 hours according to several regulations such as the Indonesian Government Regulation number 41 of 1999 is 65 μg/m$^3$; on the other hand, according to the National Ambient Air Quality Standards - US EPA$^3$, it is 35 μg/m$^3$, and according to WHO air quality guidelines$^{25}$, it is 25 μg/m$^3$. The measured concentration exceeds the quality standard, meaning that the exposure is dangerous for humans and the environment. The highest concentration is in the stockpile area with the measurements during morning shift of 137.2 μg/m$^3$. Stockpile is a place to store coarse aggregate (gravel) and fine aggregate (sand). Much particulate dust spreads when the aggregate is blown away by the wind because it is placed in an open space. The aggregate transfer to the Load-In Hopper uses Wheel Loaders, the movement of Wheel Loader tires and the smoke of the vehicle can also spread particulate dust. These things allow high concentration of PM$_{2.5}$ in the air.$^{2,22}$

This study uses calculation done individually and on the average of RQ value at Batching Plant. The calculation of the Batching Plant area with real time exposure duration does not indicate any risk, but the duration of life time exposure shows that health risk will start from the duration of work for 9 years. Therefore, risk management is necessary. Risk management planning can be done in arithmetic calculation of intake with various modifications. What can be done is to do risk management to reduce PM$_{2.5}$ concentration.

**CONCLUSION**

The conclusion of this study is that the average concentration of PM$_{2.5}$ at Batching Plant pass the limit value based on The Indonesian Government Regulation number 41 of 1999, The National Ambient Air Quality Standards, and WHO air quality guidelines. The average calculation of risk with real time duration is not treacherous because RQ=0.412. But, the calculation shows that PM$_{2.5}$ is risky to workers in life time duration (25 years) with the average yield at least for the next 9 years because reach RQ=1.096. Therefore, risk management can be done by reducing the PM$_{2.5}$ concentration.

**Acknowledgements:** This study was supported by Universitas Indonesia through PITTA grant number 2210/UN.2.R3.1/HKP.05.00/2018. We are grateful to all research subjects and the management team of the concrete batching plant.

**Ethical Approval:** This research number of the ethical approval from the Ethical Research Committee is 280/UN2.F10/PPM.00.02/2018 dated April 6th 2018.
**Conflict of Interest:** There is no conflict of interest for this research.

**REFERENCES**


RAPD Identification of Bacteria Isolated from Arm Third Degree Burn Wound

Hanan Sami Nouri

Dept. of Basic Nursing Sciences, College of Nursing / Mosul University, Iraq

ABSTRACT

This study aims to isolate different types of bacteria from the wounds of the third degree burns in the forearm area and to define those types at the morphological level and using the RAPD-PCR technique. And study the sensitivity of isolated species towards certain types of antibiotics traded. 35 swabs of third-degree burns were collected in the forearm area of 35 patients. 12 species of bacteria were isolated and purified from those swabs. The necessary tariff tests were carried out.

The isolated bacteria were identified as morphology and the result was the following: Bacillus sp, Enterobacter sp, E.Coli sp, Klebsella sp, Pseudomonas aeruginosa and MRStaphylococcus aureus. Seven antibiotics; amoxicillin, Cefaclor, ampicillin, amoxicillin/clavulonic acid, Ciprofloxacin, Imipenim and Vancomycin were tested to identify the isolates of the isolated bacteria. DNA was extracted from isolates. The RAPD-PCR method was applied to DNA extracts according to a standard method using 3 primers. This technique resulted in repeated trip patterns used for genetic differentiation. The phylogeny tree in Figure 2 obtained from statistical analysis of the RAPD-PCR band pattern of 12 bacterial isolates using three RAPD primer shows that there are only two main groups branched from one ancestor at linkage distance 16%. One of these groups contains isolate number 10, while the other group contains isolate no.12 and branched at linkage distance 15% to other two sub groups one of them contains isolates 1, 11 while the other group contains the other remaining 8 isolates. The study showed different types of infectious bacteria according to the age of the injured and the causes of injury, which is worth studying on a larger scale.

Keywords: third degree burn; infection; bacteria; identification; RAPD-PCR; sensitivity

INTRODUCTION

The skin is the first line of the immune system of the body as well as containing nerve cells to do the sensory function.[1, 2] Burns are one of the most common home injuries, especially in children. Burns are not limited to the pain and biting sensation, but can cause severe damage to skin and skin, causing skin cells to die in the affected area.[3] Although severe burns may require emergency measures to prevent complications, burns are often recovered without complications, taking into account the degree of incineration and the cause[4, 5].

Burns are divided into three main types depending on the degree of damage to the skin and skin; first-degree burns, mildest damage, second-degree burns and third-degree burns, the most severe type of burns.[5]

The immune response changes after the injury burns, especially the third degree, where the first defense wall of the body drops and inhibits immunity and less efficiency. The burns of the third degree on the largest proportion of the enemy and whenever the destruction of the skin on a large scale, the greater the cases of infection[4, 6].

RAPD reactions are PCR reactions, using a small-size primer that can be randomly attached to multiple DNA sequences in the bacterial genome and the creation of repeated autopsy patterns that are used in genetic differentiation[7]. If there is a mutation in the DNA template at the site that was previously a supplement to
the paint, a PCR product will not be produced, resulting in a different pattern of the DNA parts that are inflated on the gel. The other difference between this method and ordinary PCR is the use of two different temperatures. Because bacteria are the main cause of nosocomial infection, especially in patients with burns\(^6\).

The aim of this study was to determine the genetic pattern of RAPD from strains of isolated bacteria from burn patients to characterize their genetic diversity.

**MATERIALS AND METHOD**

The 35 sterile swabs samples were collected from burned arms at \(\ldots\) hospital after having a signed agreement form of the patient’s family.

Samples were properly labeled with patients Name, Age, and Gender. The samples then were processed at the laboratory.

We used 3 different media to cultivate the isolated bacteria; Nutrient agar, Blood agar, and MacConkey’s agar with the addition of antifungal agent like azole. The media was autoclaved for 15 minutes at 121°C.

Streaking of the samples on the plate were done in three plates each with one of the previously mentioned media and incubated for 48 hours on 37°C.

The colonies that appeared on the plates were sub cultured and purified. The pure colonies obtained from the sub culturing and purification process were numbered and labeled.

Morphological and biochemical identification of the purified isolates were performed\(^4\). Table 1 summarize the biochemical tests used to identify the bacterial isolates. Table 2 shows the list of antibodies used in identification of the bacterial shambles.

![Table 1 the biochemical tests used to identify the bacterial isolates.](image)

<table>
<thead>
<tr>
<th></th>
<th>Bacillus sp</th>
<th>Enterobacter sp</th>
<th>E.Coli sp</th>
<th>Klebseilla sp</th>
<th>Pseudomonas aeruginosa</th>
<th>MRStaphylococcus aureus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalase test</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Oxidase test</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Eg cougulase</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Litmus milk decolorization test</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IMVIC</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

![Table 2 the list of antibodies used in identification of the bacterial shambles.](image)

<table>
<thead>
<tr>
<th></th>
<th>amoxicillin</th>
<th>Cefaclor</th>
<th>ampicillin</th>
<th>Amoxicillin clavulonic acid</th>
<th>Ciprofloxacin</th>
<th>Imepenim</th>
<th>Vancomycin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacillus sp</td>
<td>S</td>
<td>R</td>
<td>S</td>
<td>R</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Enterobacter sp</td>
<td>R</td>
<td>S</td>
<td>R</td>
<td>S</td>
<td>S</td>
<td>R</td>
<td>S</td>
</tr>
<tr>
<td>E.Coli sp</td>
<td>S</td>
<td>R</td>
<td>S</td>
<td>S</td>
<td>R</td>
<td>R</td>
<td>S</td>
</tr>
<tr>
<td>Klebseilla sp</td>
<td>R</td>
<td>S</td>
<td>R</td>
<td>R</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>S</td>
<td>S</td>
<td>R</td>
<td>R</td>
<td>S</td>
<td>S</td>
<td>R</td>
</tr>
<tr>
<td>MRStaphylococcus aureus</td>
<td>R</td>
<td>R</td>
<td>S</td>
<td>S</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

DNA extraction

From a bacterial suspension 200 ml was used in genomic DNA extraction using DNA extraction kit (Bio-Rad, USA).
RAPD-PCR reaction

DNA amplification was performed on a thermo cycler (Bio Rad, USA) in a final volume of 25 µL containing 21 µL of master mix (thermo, usa), 2.5 µL of 50 mM primer and 1.5 µL genomic DNA. A list of primers used in this study as follows: primer 1 (3 - AGCGGGCCAA-5), primer 2 (3-GCGCGATCTGGTTCACTCG-5), primer 3 (3- CAGTGAAAATTCACTGGCAAC-5). [8]

The cycling conditions were as follows: initial denaturation at 96 °C for 2 min followed by 3 cycles of denaturation at 94 °C for 1 min, annealing at 36 °C for 2 min, extension at 72 °C for 2 min and 29 more cycles of denaturation at 94 °C for 1 min, annealing at 58 °C for 1 min, extension at 72 °C for 1 min and a final extension at 72 °C for 5 min[8].

The RAPD-PCR products were loaded on a 1.5%(w/vol) agarose gel with 0.5 mg/ml of Ethidium bromide, and were analyzed by gel electrophoresis and banding patterns were observed in Gel-Documentation system (Uvitec, UK). A 1 kilobase DNA ladder (Fermentas, Canada) was used as a molecular size standard. The RAPD fingerprints were analyzed and genotypes were assigned on the basis of number and weight of band differences. Each reaction was repeated at least three times for reproducibility. The minor non reproducible reactions were excluded from the study.

RESULTS AND DISCUSSION

After infection with third degree burns is a critical condition to affect the immune system. Topical antibiotics are used intravenously to prevent and treat infection. The collected samples were divided into groups according to type and by age and then by isolated bacterial species after their morphological and biochemical identification. This result was recorded in Table 4. The males and females were eliminated 51.5% and 48.5%, respectively. The majority of the studied samples were of the age of 25-45 years by 60.1%. The most common cause of the eye injury was the incidence of burns as a result of edible oil by 42.9%.

Table3. statistical analysis of the patients data

<table>
<thead>
<tr>
<th>No</th>
<th>percentage</th>
<th>Types of bacteria isolated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>18</td>
<td>51.5%</td>
</tr>
<tr>
<td>Female</td>
<td>17</td>
<td>48.5%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td>5</td>
<td>14.2%</td>
</tr>
<tr>
<td>10-25</td>
<td>9</td>
<td>25.7%</td>
</tr>
<tr>
<td>25-45</td>
<td>21</td>
<td>60.1%</td>
</tr>
<tr>
<td><strong>Cause of burn</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct fire</td>
<td>8</td>
<td>22.8%</td>
</tr>
<tr>
<td>Hot water</td>
<td>10</td>
<td>28.5%</td>
</tr>
<tr>
<td>Cooking oil</td>
<td>15</td>
<td>42.9%</td>
</tr>
<tr>
<td>Electricity</td>
<td>2</td>
<td>5.8%</td>
</tr>
</tbody>
</table>
The results of the current study showed the presence of infection in burns of the third degree in the forearm. These results are consistent with the study conducted by [6], which investigated the association of microbes with burn patients. In 2004, isolated a number of different bacterial isolates from post-burn infection, including S. aureus, epidermis and klebsiella [2, 9]. These results are consistent with our study, which isolated eight different types of bacteria including Pseudomonas aeruginosa, Staphylococcus aureus, Klebsiella, E.coli, epidermis, Enterobacter, and bacillus. Adeyemiet al; in 2006, it was reported that most severe burns were due to the association of pseudo-auregenousa, klebseilla, staphylococcus aureus, E. coli and Staphylococcus epidermis. [3, 10] The present study agrees with the previous researcher. It is also in line with research conducted by [10-12]. The results of our study are consistent with the results [7]. The causes of this high frequency of Pseudomonas aeruginosa, Staphylococcus aureus and Klebsella may be present in abundance in the air, and can remain within the waste range of environmental conditions and show resistance against a number of antibiotics. The current research work is also consistent with reports [13, 14]. It is well documented that children 1-15 years of age are more likely to have burns [14]. The results of our study showed that the highest percentage of burn injuries in the age group 25-45 years were recorded 60% followed by age group. These results are consistent with the research work of [13, 15].

The 12 bacterial isolates were tested on molecular levels by DNA fingerprinting with random primers (RAPD) (figure 1). The RAPD analysis data of these bacterial isolates can be used for further molecular identification using 18srRNA sequence. The phylogeny tree in Figure 2 obtained from statistical analysis of the RAPD-PCR band pattern of 12 bacterial isolates using three RAPD primer (Figure 2) shows that there are only two main groups branched from one ancestor at linkage distance 16%. One of these groups contains isolate number 10, while the other group contains isolate no.12 and branched at linkage distance 15% to other two sub groups one of them contains isolates 1, 11 while the other group contains the other remaining 8 isolates.

Figure 1 – RAPD-PCR fingerprints of 12 isolates from burn patients A: using primer1 B: using primer2 C: using primer3. M: DNA molecular weight marker (1 kilo base), 1–12: Samples
Figure 2. The phylogenetic tree

The gel electrophoresis gel shows some common bands of some bacterial species indicating that those samples are related on molecular levels. The data of the RAPD analysis with those specific primers previously mentioned in table 4 was enlisted to relate the data obtained from the morphological identification, antibiotic sensitivity test and molecular analysis of the tested isolates.

The data revealed that isolates 10, 12 were the most far genetic distance among the twelve bacteria isolates, while isolates 1, 11 were laid in the same group indicating genetic similarity between these two isolates which in turn differ from the 8 remaining bacterial isolates. This results indicates that there were only one species of Enterobacter (sample 12) and Bacillus (sample 10). Isolates 1 and 11 represents 2 species of E.Coli while Pseudomonas sps showed to be in 3 different species (samples 2, 6, 4). MRStaphylococcus on the other hand represented by 3 subspecies 5, 8, 7. There were 2 isolates from the morphological identification appeared to by Klebsella sp while genetically they were not in the Staphylococcus branch on the phylogenetic tree analysis.

The difference in genetics observed in this study is not expected because the result is different depending on the cause of the injury and the difference in the age of the patient. Some researchers in their experiments also reported a wide genetic variation and the appearance of some unexpected bacterial species in cases of burns in different degrees.[16]

CONCLUSION

The study showed genetic differences among the types of bacteria isolated from wounds from burns of the third degree. It also showed the presence of some unknown organisms that show morphology that they will be developed and therefore we recommend completing research on those species to define them molecularly. The study showed different types of infectious bacteria according to the age of the injured and the causes of injury, which is worth studying on a larger scale.

Conflict of Interest: The author has no disclosures to report.

Source of Funding: Self.

Ethical Clearance: Not required.

REFERENCES

1. Neyestanaki, D. K., Mirsalehian, A., Rezaghizadeh, F., Jabalameli, F., Taherikalani,

2. Bertrand, J. Y., Giroux, S., & Golub, R. Bibliography Current World Literature,2018. (12)3, emergence, 10, 03]


14. Abdel-Sayed, P., Kaeppe1i, A., Siriwardena, T., Darbre, T., Perron, K., Jafari, P., ... & Applegate, L. A. Anti-microbial dendrimers against multidrug-resistant P. aeruginosa enhance the angiogenic effect of biological burn-wound bandages. Scientific reports, 2016.6, 22020]


The Impact of Social Media in Improving Patient’s Mental Image Towards Healthcare Provided by Private Hospitals’ in Amman/Jordan

Mahmood Al-Samydai¹, Ali Al-kholaiifeh², Ali Al-Samydai³

¹Department of Marketing, Faculty of Economic and Administrative Sciences, Al-Zaytooneh University of Jordan, Jordan, Box130, Amman, 11733 Jordan, ²Faculty of Economic and Administrative Sciences, Al-Hussein Bin Talal University. Jordan, ³Department of Pharmaceutical Science, Faculty of Pharmacy, Jordan University Amman/Jordan

ABSTRACT

The main objective of this study is to identify the impact of social media tools on improving patients’ mental image of the healthcare provided by private hospitals (an applied study in Amman city).

An analytical descriptive style was used to achieve this goal because this method was appropriate for the nature of the study. A questionnaire was designed as a tool to collect data. The questionnaire was first presented to a number of experts in the marketing field. The study population consisted patients treated by private hospitals in Amman, Jordan. The study sample was a proper sample of this population: (550) patients received copy of the questionnaire, and (513 copies were returned and deemed suitable analysis.

The study shown that social media had a statistical significant impact on patients’ mental image of private hospital, and Facebook shown the greatest effect cognitive and behavioural dimension, whereas Twitter showed the greatest effect on the influence dimension.

Keywords: Social Media; Mental Image; Healthcare Service; Private Hospital; Amman.

INTRODUCTION

All animal species have perfected a system of communication, but humans are the only species capable of spoken language [¹, ²]. Communications are important for many reasons. For humans in particular, communication a sense of social cohesion. As mankind has evolved over the centuries, our means of communication have followed suit. Communication has existed in different forms since man appeared on Earth [²]. Communication methods have evolved over time, from direct contact to letters to landline phones and now to communication through social media [¹].

The internet plays an essential and important role in facilitating communication between people and organizations locally on a global and international scale [³]. Business organizations have adopted electronic means to promote their products and take advantage of the benefits offered by these new forms of communication [⁴].

The information revolution ushered in by the internet leads organizations to seek to adapt these methods of communication to reach their targeted markets and strengthen their relationships with segments of these markets. This is done by circulating and, publishing information about their products [⁴,⁵] these promotions may be communicated by the organization itself or through electronic communication methods, especially social media, the goal of building a positive mental image of organization’s products or services. Organizations do this to gain popularity, name recognition and good reputation [⁶].

Corresponding author
Mahmood Al-Samydai
Mahmod_jasim2000@yahoo.com; 00962788106069

DOI Number: 10.5958/0976-5506.2019.00339.5
Like all other organizations, hospitals particularly private hospitals work hard to build a positive mental image of the services they offer to patients. In building this image, they are aware of the importance of communicating and sharing information with patients [7].

This need, requires them to adapt the modern communication methods, including social media and to use these methods to circulate and publish information about their services [8]. These services vary in quality which influences patient thoughts, feelings and behaviours towards the services of these private hospitals [9].

Building a positive mental image is not an easy matter. The adopted strategies must affect the three dimensions of mental image (the cognitive dimension, Influence dimension and behavioural dimension) [10]. This can be done only by providing accurate information, establishing credibility and maintaining continuous communication with patients in a way that creates the best possible mental image and influences patient’s future behaviour choosing and trusting a particular hospital [11,8].

Previous studies have indicated that there is, at least, one social media account for every household in the world. This finding clearly demonstrates how far these communication methods spread and how quickly society has accepted them, regardless of the cultural, social, religious, racial and ethnic differences among people [12,13]. Social media gathers people from different location and countries under one umbrella called the internet [6].

In the last few years the healthcare economy has further developed as a result of technological developments and the implementation of ideas and principles borrowed from business economic analysis [8,14].

Because of this hospitals and healthcare centers have transitioned from location for patients lodging hygienic system that provide many types of integrated healthcare services, meets patients’ their health needs and improve patients’ opinions of healthcare [15]. Based on business principles, economic analysis and the concept of the healthcare economy, healthcare marketing has become an essential way for healthcare system to address heavy and increasing market competition [6,36]. Healthcare marketing maintains relationships with exiting patients and attract new patients. Also increases patient satisfaction and improves mental the image of the healthcare services provided by these systems [11].

From this perspective, this study examines the role of social media in proving patients’ mental image of the healthcare services provided by private hospitals.

**Study questions**

Administrators of hospitals and healthcare centers have increasing focused on their presence on social media and its effects on the organization’s target audiences. They believe these methods will reach the largest number of patients while incurring low operational costs (i.e., an internet connection, electronic devices such as computers and mobiles and the salaries of the employees who manage these accounts) It is worthwhile to mention that information circulated by social media is uncontrolled, which causes problems for private hospitals in Jordan.

The study assumes that many private hospitals in Jordan have account or on at least one social media. A field survey of private hospitals found that the most commonly used social media methods are websites, Facebook and Twitter.

Based on this information, the research questions were formulated as follow:

What is the impact of social media (e.g., websites, Facebook and Twitter) on patients’ mental image of the healthcare services provided by private hospitals?

**Study objectives**

The current study aims to understand the impact of social media (websites, Facebook and Twitter) on the mental image of healthcare services provided by private hospitals.

**Study model**

The following diagram (Figure-1) represents the study model based on the study problem, objectives and hypotheses, with reference to [4,17-24].
Summary of Study Model Components

![Study model diagram]

Study tools

Study methodology

Study tools

The study tool was (the questionnaire) and the data it provided to the researcher from the research sample. The opinions of many specialists in the field, such as researchers, scholars, the authors and university professors have been considered in finalizing the questionnaire and explaining it is related to the subject.

The questionnaire is divided into two parts: the first part is concerned with the demographic data of people respondents, and the second part includes the paragraphs that measure the questionnaire domains (fields).

The uses five-point Likert scale as follows questionnaire answers, Likert Scale, of five scales, was relied on:

((5) strongly approve, (4) approve, (3) neutral, (2) do not approve, (1) strongly do not approve).

Study sample

The sample is derived from the population of patients who have received healthcare services at private hospitals in Amman, the capital of Jordan. The number of those hospitals 2015 was (41) covering different fields of medicine. A proper sample of (550) patient received, the questionnaire. They returned were (513) valid copies of the questionnaire, for a response rate of 93.27%.

Stability of the study tool

The Cronbach’s alpha test was used to measure the stability of the measurement tool. The value of (α) reached (0.988) for the questionnaire as a whole. This is an excellent value since it is higher than the accepted value (0.60).

The following table (Table-1: Stability Test) presents the value of (α) for each variable.

<table>
<thead>
<tr>
<th>Variable</th>
<th>(α) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website</td>
<td>0.951</td>
</tr>
<tr>
<td>Facebook</td>
<td>0.919</td>
</tr>
<tr>
<td>Twitter</td>
<td>0.940</td>
</tr>
<tr>
<td>Cognitive Dimension</td>
<td>0.945</td>
</tr>
<tr>
<td>Affective Dimension</td>
<td>0.943</td>
</tr>
<tr>
<td>Behavioural Dimension</td>
<td>0.959</td>
</tr>
<tr>
<td>Social Media Methods</td>
<td>0.972</td>
</tr>
<tr>
<td>Mental Image</td>
<td>0.961</td>
</tr>
</tbody>
</table>

Overlapping (Correlated) relation test

The VIF test and the tolerance test were used to test the extent of the relationship between the independent variables, and of VIF was less than (0.10) and the value of tolerance is greater than (0.10) which is evidence that there is no multicollinearity.

The statistical treatment used in the study

The researcher (scholar) relied on a number of
statistical tests to support the study objectives by using the Statistical Package for the Social Sciences (SPSS) program.

**RESULTS**

Many statistical methods were used within SPSS to reach the results of this study.

**Table 2. Study questions distributed on pivots (Axes) of social media methods.**

<table>
<thead>
<tr>
<th>Serial</th>
<th>Pivot (Axis) of Social Media Methods</th>
<th>No. of Questions for Each Pivot</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Website</td>
<td>18</td>
</tr>
<tr>
<td>02</td>
<td>Facebook</td>
<td>18</td>
</tr>
<tr>
<td>03</td>
<td>Twitter</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Mental Image Dimensions:</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td># Cognitive Dimension</td>
<td>4</td>
</tr>
<tr>
<td>05</td>
<td># Affective Dimension</td>
<td>4</td>
</tr>
<tr>
<td>06</td>
<td># Behavioural Dimension</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>66</strong></td>
</tr>
</tbody>
</table>

The Impact of Social Media Methods on Mental Image Dimensions explains the impact of each method on mental image in a combined form, using (one-simple t-test) to test the branch hypotheses.

It is notable that the value for the t-test for the three methods is greater than the tabulated value (1.96); based on this, these hypotheses are accepted. In the following, we present the regression coefficients (B, Beta, t, Sig.) for social media methods.

We notice that the value of F is (179.981) and is of statistical of significance at the level of (0.05); this indicates is a statistically significant impact of social media on patients ‘mental image of healthcare services. The strength of the relationship \( R= 0.842 \) and the independent variables explain 61.2 % of the variation of the following variable.

In addition, the drawn value for each independent variable statistically significant at the level (0.05). This indicates that there is an impact for each variable on the following variable. Facebook has the highest impact because the value of Beta= 0.406 is the greatest value.

**DISCUSSION**

This study found the following results:

Social media has a statistically significant impact on the mental image of healthcare services, Facebook has the greatest effect. This result agrees with what is presented in the literature where social media methods play an important role in the marketing field. Furthermore, this result coincides with the results of previous studies, such as Hashem [19] Kaite and Piligrimiene [18], and Nikolova [17]. This confirms the importance of using social media in marketing campaigns, for hospitals, the scope of this study.

Statistical treatment finds the presence of a statistically significant impact of websites on mental image dimensions for healthcare services provided by private hospitals, at the level (\( \alpha \leq 0.05 \)). Additionally, there is an impact of Facebook on mental image dimensions for healthcare services provided by private hospitals, at the level (\( \alpha \leq 0.05 \)). In addition, there is an impact of Twitter on mental image dimensions for healthcare services provided by private hospitals, at the level (\( \alpha \leq 0.05 \)).
Social media has a statistically significant impact on the influence dimension for healthcare services provided by private hospitals. Twitter has the highest effect. This can be explained because Twitter is an interactive news site with users inside and outside Jordan, whose opinions may play an important role in creating the mental image of healthcare services. This result coincides with the results of previous studies, such as Hashem [19] Kaite and Piligrimiene [18], and Nikolova [17].

Moreover, social media has a statistically significant impact on the cognitive dimension of healthcare services provided by private hospitals. Facebook has the highest effect. This can be explained because Facebook is an interactive social site connecting family and friends inside and outside of Jordan; this interaction increases users’ cognitive about the healthcare services provided by private hospitals, the scope of the study. This result matches the results of previous studies, such as Hashem [19] Kaite and Piligrimiene [18], and Nikolova [17].

Social media also has statistically significant impact on the behavioural dimension for healthcare services provided by private hospitals. Facebook has the highest effect. This can be explained because Facebook is an interactive social site connecting family and friends inside and outside of Jordan; this interaction contributes to the development of behaviour plans for healthcare services provided by private hospitals, the scope of this study. This result matches the results of previous studies, such as Hashem [19] Kaite and Piligrimiene [18], and Nikolova [17].

The mental image dimensions, of g healthcare services provided by private hospitals, contribute to improving patients’ mental image; at the level (\( \alpha \leq 0.05 \)). This shows that the general average of (4.101) reflects a high level of approval towards cognitive dimension. Thus, there is a high level of positive cognition for the provided healthcare services. It also shows that the general average of (3.977) reflects a higher approval level towards the influence dimension. This means that there is a high level of positive influence for the provided healthcare services. It also shows, that the general average of (3.931) reflects a high level of approval towards behavioural dimension. This means that there is a high level of positive approval for the provided healthcare services.

### CONCLUSION

Although this study is very limited, it provides an important contribution to studying and investigating mental image and its three dimensions and the impact of social media on each dimension of mental image. It also explores how best to improve mental image in the healthcare sector, an important and vital field in Amman, Jordan. This issue concerns e society in a significant and vital way because everyone needs healthcare services regardless of ages.

Future studies must explore other aspects of the subject of healthcare services and social media, including how to create a positive mental image for these services.

**Ethical Clearance:** Not required

**Source of Funding:** Self

**Conflict of Interest:** Nil

### REFERENCES


Sequencing of the Exon 17 C/T, Intron 3 and Intron 8 in INSR (Insulin Receptor Gene) to Identification New SNPs in Iraqi Women with Polycystic Ovarian Syndrome (PCOS)

Noor H. Mohammad¹, Abdul Kareem A. AL-Kazaz ¹
¹Department of Biotechnology, College of Science, University of Baghdad, Baghdad, Iraq

ABSTRACT

In this case-control design study, 46 clinically diagnosed Polycystic Ovarian Syndrome (PCOS) in Iraqi women and 20 healthy Iraqi female were enrolled for analysis of the Exon 17 C/T Single Nucleotide Polymorphisms in Insulin Receptor Gene (INSR) gene as predisposing molecular marker for PCOS and its relationship with diabetes. Genomic DNA was extracted from whole blood of each subject using wizard genomic DNA purification kit. Specific primers for Single Nucleotide Polymorphism (SNPs) analysis of INSR Exon 17, Intron 8 and 3 were used Single Nucleotide Polymorphism-Polymerase Chain Reaction (SNPs-PCR) amplification reaction. Post PCR Restriction Fragment Length Polymorphism (PCR-RFLP) was done for PCR-Products using the Restriction Enzyme PMLI. In conclusion, the Exon 17 C/T Single Nucleotide Polymorphism in INSR gene can consider as predisposing molecular marker for PCOS that can transmitted offspring, colorectal cancer (CRC) and Breast Cancer in Iraqi women and the Intron 8 Single Nucleotide Polymorphism can consider as predisposing molecular marker for PCOS and Diabetes that can be transmitted offspring in Iraqi women. The hormonal values were takes as detected markers for PCOS such as Luteinizing Hormone (LH) values that appears in high level in women with PCOS either they were married or unmarried and the Follicle Stimulating Hormone (FSH) that appear in low levels in women with PCOS.

Keywords: Exon 17 C/T, Intron 3, Intron 8, Insulin Receptor Gene, SNPs, Polycystic Ovarian Syndrome.

INTRODUCTION

Polycystic ovarian syndrome, which used to be called Stein and Leventhal Syndrome, is a common condition affecting 5-10% of women of childbearing age. This disorder is probably the most common hormonal abnormality in women of reproductive age. In 95% of women with PCOS, an ultrasound of the ovaries will reveal cysts that can be seen on the surface of the ovary. These ovarian cysts are often lined-up to form the appearance of a “pearl necklace” [1].

The susceptibility genes for PCOS are unknown; several candidate genes have been evaluated. Most of researchers found the evidence that INSR gene show consistent; linkage and association with PCOS. The INSR receptor gene comprises 22 exons spanning 120kb on chromosome 19. Mutations in exon 17 and intron 13, 8 that encode the tyrosine kinase domain of the insulin receptor, have been shown severe insulin resistance and hyperinsulinemia. Two possible approaches are used to identify a genetic locus for PCOS genes: (i) association studies where a predisposing allele is expected to be found more frequently in the affected population than the normal individuals and (ii) linkage studies where the probands and their families are investigated to determined if particular genomics landmarks are distributed independently or in linkage with the phenotype. While the mode of inheritance is not required for the association studies, it requires a relatively large set of individual for a clear conclusion [2].

Many genes presented expression suggesting thus that the genetic abnormality in PCOS affects signal transduction ruling insulin action and their secretion.
Although the cause of PCOS is not well understood, insulin resistance may be a key factor. Insulin is vital for the transportation and storage of glucose at the cellular level; it’s helps to regulate blood glucose level and has a role in carbohydrate and lipid metabolism. These conditions put those with PCOS at a higher risk of developing type 2 diabetes (T2D) and cardiovascular disease.[3,4].

The aims of this study is to examine whether the insulin receptor INSR gene contributes to genetic susceptibility to the PCOS and to analyze the exon 17 C/T single nucleotide polymorphism in INSR a predisposing molecular marker for PCOS.

**MATERIAL AND METHOD**

**Blood Samples.**

The samples were collected from AL-Yarmok Hospital in Baghdad, from 17 December 2013 to 17 June 2014 using EDTA tubes and sterile syringe which consist of 70 unrelated females (20 controls, 50 patients). The samples were transferred to the laboratory for DNA extraction. Sixty-eight human blood samples consisting of 46 samples infected with PCOS that have different ages ranged between 11-67 years old and their weight ranged between 30-120 kg. According to these data there will be 4 groups that classified due to their ages and weight, these are the properties of each groups.

**DNA extraction** that used in this study.

DNA extraction that used in this study according to the Genomic® Wizard Purification Kit.

**Estimation of the DNA concentration by the Nanodrop equipment.**

The DNA concentration was determined by using the Nanodrop according to [5].

**Estimation of DNA quality**

Estimation of DNA quality also can assess by simple analyzing the DNA by Agarose gel electrophoresis [5].

**Amplification of DNA by PCR technique.**

PCR reaction performed using the following:

**Specific primers and their preparation.**

There are variant SNPs in the INSR gene were selected based on way of Xu et al. [6].

**Go Taq® Green Master Mix**

The master mix reactions were used to achieve the homogeneity of reagents and reduced the risks of contamination. All amplifications were performed on ice in aseptic condition using a laminar air flow hood [6].

**Table (1) the sequences and genes locations of specific primers [6].**

<table>
<thead>
<tr>
<th>Primers</th>
<th>Sequence</th>
<th>genes Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Rs8108622 / rs10500204 (forward) Rs8108622 / rs10500204 (reverse)</td>
<td>5’TCCCAGATACCAAGGATGCG3’ 5’GAGAATTAGCCAAGCGAGAGTGT3’</td>
<td>INTRON 3</td>
</tr>
<tr>
<td>**RS2059807 (forward) Rs2059807(reverse)</td>
<td>5’GACCCAGTATGCCATCTTTGTG3’ 5’TGCTGAGCCCAGGAGTTTG3’</td>
<td>INTRON 8</td>
</tr>
<tr>
<td>*** RS1799817 (forward) Rs1799817 (reverse)</td>
<td>5’TCCAGAAAGTGATGAGAACGTGAT3’ 5’GTCAAGCTGAGTCCAGGAGTCT3’</td>
<td>EXON 17</td>
</tr>
</tbody>
</table>

*primer 1, **primer 2, ***primer 3
Protocol of specific PCR

This protocol consists of: PCR primers, PCR Mix , Amplification reaction, PCR programe according to [1,6].

Detection single nucleotide polymorphisms (SNPs) by RFLPs

Some samples were surveyed for characterizing single nucleotide polymorphisms (SNPs) on Insulin receptor gene (INSR gene) by RFLPs technique (PCR amplification, followed by restriction enzyme digestion [6].

Restriction Enzyme PMII

PMII is a restriction enzyme that isolates from product source Pseudomonas maltophilia. There are several key factors to consider when setting up a restriction endonucleases digest using the proper amount of DNA, (incubation time, temperature and buffer) provided by (Biolabs). enzyme and buffer components in the correct reaction volume that lead to having optimal digestion.

Detection of single nucleotide polymorphism (SNPs) by automated sequencing.

Several DNA sample from women that have PCOS were taken to have PCR reaction with different molecular markers, according to NICEM Company / USA to have an automated sequencing by ABI3730XL APPLIED BIOSYSTEM machine , which gave the identity of the genes comparison with the original genes in Gene Bank in NCBI.

Results and discussion

Table (2): Unmarried and Married Women with PCOS.

<table>
<thead>
<tr>
<th>Unmarried Women with PCOS (G1)</th>
<th>Married Women with PCOS (G2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Samples ID</strong></td>
<td><strong>Ages (Years)</strong></td>
</tr>
<tr>
<td>N12</td>
<td>19</td>
</tr>
<tr>
<td>N15</td>
<td>18</td>
</tr>
<tr>
<td>N16</td>
<td>13</td>
</tr>
<tr>
<td>N18</td>
<td>11</td>
</tr>
<tr>
<td>N19</td>
<td>27</td>
</tr>
<tr>
<td>N23</td>
<td>22</td>
</tr>
<tr>
<td>N26</td>
<td>25</td>
</tr>
<tr>
<td>N30</td>
<td>15</td>
</tr>
<tr>
<td>N32</td>
<td>15</td>
</tr>
<tr>
<td>N35</td>
<td>28</td>
</tr>
<tr>
<td>N39</td>
<td>12</td>
</tr>
<tr>
<td>N42</td>
<td>30</td>
</tr>
<tr>
<td>N45</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table (3): Unmarried and married Women with PCOS.

<table>
<thead>
<tr>
<th>Unmarried Women with PCOS (G3)</th>
<th>Married Women with PCOS (G4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samples ID</td>
<td>Ages (Years)</td>
</tr>
<tr>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>N1</td>
<td>40</td>
</tr>
<tr>
<td>N4</td>
<td>37</td>
</tr>
<tr>
<td>N7</td>
<td>42</td>
</tr>
<tr>
<td>N17</td>
<td>47</td>
</tr>
<tr>
<td>N20</td>
<td>45</td>
</tr>
<tr>
<td>N22</td>
<td>40</td>
</tr>
<tr>
<td>N27</td>
<td>45</td>
</tr>
<tr>
<td>N29</td>
<td>39</td>
</tr>
<tr>
<td>N34</td>
<td>40</td>
</tr>
<tr>
<td>N36</td>
<td>50</td>
</tr>
<tr>
<td>N37</td>
<td>47</td>
</tr>
<tr>
<td>N43</td>
<td>41</td>
</tr>
</tbody>
</table>

Concerning molecular genetic studies, PCOS is one of the most extensively studied endocrinopathys in women and attention has been given to insulin resistance with special focus on the *INSR* gene. Therefore in this study we used family- based analysis in order to investigates the relationship between the *INSR* gene SNPs and the genetic component of PCOS [2,6,7].

Results of RFLP

After PCR technique for all the samples, several PCR product were selected such as (46, 11, 31, 5, 2 and 14) with different primers to incubate them with restriction enzyme PMLI at 37°C for 1 hour and then these samples were migrated in 0.5 X TBE buffer with 2.5% Agarose gel for (1 hour, 90 V). The result was three restriction fragments they are 317 bp, 264 bp and 43 bp.

In figure (1) that refer to have three restriction fragments on line 13 which belongs to sample N31 for the primer (rs17799817) which has 317bp, 264 bp but the last fragment which is 43 bp did not appear in the gel due to its small size.

While in figure (2) illustrate the line 1 which belongs to sample N5 for the primer (rs8108622 and rs10500204) has three restriction fragments they are 317 bp, 264bp, 43bp.

Figure (1): The PCR- RFLP analysis of intron 8 of the INSR gene. The line 13 that refer to sample N31 that has 317bp, 264bp only.
That’s mean that the sample N5 for primer (rs8108622 and rs10500204) and the sample N31 for the primer (rs17799817) have the same sequence as same as PML1/sequence. The other samples that did not have any restriction fragments because of one of these reasons:

A. changing in their sequence.
B. has a mutation.
C. changing in their original replication

The SNPs in exon 17 of the INSR gene in the tyrosine kinase domain of the insulin receptor have paid more attention [2,8]. Found an association between rs1799819 and PCOS.

They argued for the first time that the INSR gene itself took part in the development of PCOS, that’s was not similar to the data of this study whose found that the rs8108622 & rs10500204 and rs2059807 have an association with PCOS while the rs1799819 does not have an association with PCOS in Iraqi women.

In India, the researchers found an association of rs1799817 with indices of insulin resistance and hyperandrogenemia in the same subgroup [1,7]. According to the results of this study that found the rs1799817 have not significantly over transmitted to PCOS off spring from their parents by using a genetic approach of association analysis, while the rs2059807 and rs8108622 & rs10500204 were significantly over transmitted to PCOS off spring from their parents whose has an agreement with [9] and [1].

The insulin regulates cell growth and apoptosis by binding to its receptor (INSR) gene. Many studies show the variation in insulin pathway play a plausible role in the development of Colorectal Cancer (CRC) and breast cancer. The goal of their study was to evaluate the incidence of insulin receptor (INSR rs1799817) in people of Taleghani Hospital to investigate the role of this polymorphism in increased of CRC and breast cancer [10]; also there are many research articles have been published in this site which give support to the hypothesis that patients with insulin resistance syndrome such as obesity and T2D , might be at higher risk for developing cancer than the general population [11], which is similar to the result of this study that found the rs1799819 have an association in increased of CRC and breast cancer in Iraqi women.

However, the precise mechanism that link insulin resistance and cancer have not yet been fully understood there were more details of molecular mechanistic understanding is required to interpret the existing data together with preclinical and clinical studies.

In addition, environmental factors are also involved in PCOS. The interaction with genes may be a key point of the pathogenesis in PCOS, not only the gene itself. When we use the family trios analyzing the subject’s genotypes, the interaction would be exorcized. Therefore, there may be one reason for finding little association between two SNPs and PCOS instead of four...
SNPs  

This study covered a large series of PCOS trios and represent the first family that association with providing data about INSR gene and PCOS in Iraqi women. Finally, we used to mention that PCOS in a multifactorial disease.

RESULTS OF SEQUENCING

These PCR product samples were sent outside the country to have an automated DNA sequencing at NICEM company/ USA and worked by ABI3730XL APPLIED BIOSYSTEM machine, the INSR gene sequence was investigated because this method is more discriminating 11. From comparison of the sequence with that in the database in Gene Bank by BLAST program, the gene was identified (98%) with no gaps (0%), there were five circles that illustrates these comparisons and their means, the first and second circle means at the subject 173674 there is 2 SNPs linked to INSR gene they are: (Addition in sequence and Replace C instead of T 12).

While the third circle mean at the subject 173914 there was 1 SNP linked to the same gene it’s.. (Replace G instead of T). The fourth and fifth circles means at the subject 173914 there were 2 SNPs linked to same gene and they are (Replace G instead of T and Replace C instead of A) as shown in figure(3).

This sample was belonging to sample no.5 of primer 3. This sequence was approved to have PCOS in patient that transmitted off spring from the parents and in future can have CRC or breast cancer, this result was decomentated for the first time in Iraq.

![Figure (3): The automated sequencing of INSR (P1) from PCOS patient that have (98%) indentify with (0%) of gaps . This result was approved to have PCOS that transmitted off spring from the parent with CRC or breast cancer.](image)

While the sample no. 14 of primer 2 that refer to was sent to the same company in USA to have an automated DNA sequencing, from comparison of the sequence with that in the database in Gene Bank by BLAST programs, the gene was identified as (97%) with (1%) of gaps. There were three circles that illustrates these comparisons and their means. The first circle mean at the subject 132782 there is 1 SNP that linked to INSR gene which is addition of nucleotide in the sequence, While the second circle mean at the subject 132842 there was 1 SNP which is replace G instead of T and the third circle mean there was a semi conservative sequence that refer to the of the gene. This result was approved to have PCOS in patient that transmitted off spring from the parents with diabetes disease.

CONCLUSION

The exon 17 C/T single nucleotide polymorphisms in INSR can’t consider as predisposing molecular marker for PCOS in Iraqi women , while the SNPs in intron 3 and intron 8 can be consider as predisposing molecular marker for PCOS in Iraqi women. Found that INSR (P3) can consider as a molecular marker that approved to have CRC or Breast cancer transmitted offspring.
from the parent. Found that the INSR (rs2059807) can consider as a molecular marker that approved to have PCOS with diabetes disease which transmitted off spring from the parent.

Conflict of Interest: The author has no disclosures to report.

Source of Funding: Self.

Ethical Clearance: Not required.

REFERENCES


Factors Influencing Woman Behavior to Visit Dental Clinic to Improve their Smile

Rudaina Othman Yousif¹, Mahmood Jasim Al-samydai²

¹Department of Marketing, Faculty economics and Administrative science, Zara University of Jordan. Jordan, ²Department of Marketing, Faculty of Business, AL-Zaytoonah University of Jordan. Jordan

ABSTRACT

Women, nowadays, become more interested or more oriented to plastic surgery including smile improvement. Although smile improvement popularity is increasing among Iraqi women, but published researches are rare in this field. Consequently, the objective of this study is to determine the factors that affect woman behaviour and direct her to improve the smile.

The theory of planned behavior, developed by Ajzen in 1985 (1), and the variables were adopted and formed according to study objectives, i.e. attitude, social, perceive, cost and dentist. The study approach and methodology depended on collecting data from 367 women in Baghdad city, data was analyzed by using the proper statistical methods (SPSS) and AMOS analysis.

There are positive correlations between attitude, social, perceived, cost, dentist and intention; and the results show that the dentist has most significant effect on intention with correlation 215** and Sig 0.000. There is positive relationship between Intention and behavior with correlation 0.298** and Sig 0.000

This paper provides information about factors that impact behaviour of Iraqi woman to improve the smile, and as far as we know, it is considered to be the first study, in this field, in Iraq.

Keywords: Dental Clinic, Smile, Attitude, Social, Perceived, Cost, Intention, Woman Behavior

INTRODUCTION

Dentistry has developed, as other medical fields, especially in the last fifty years. This development does not focus only on dental treatment, but also ensures providing beauty services requested by the patient, smile improvement upon patient request (2,3). The patient need or request for plastic surgeries may be due to social pressures or perhaps due to change in beauty standards evaluations which represents the motive behind beauty revolution. It is known that media, concerned with beauty, feed this beauty revolution. As Morley, 1999 and Priest and Priest, 2004 mentioned (4,5).

In today’s society, most people, including women, have the desire to be better than before concerning enhancement of the external look. The physical appearance has an important and efficient role in self-respect and achieving success in social, functional and work. The human nature makes individuals who own positive characteristics an attractive people; those are usually received proper behavior and treatment, in many different situations, and gain from it many benefits, due to Sarwer et al 2004 (6).

Chetan et al in 2013 (7), indicates that patients have to think before taking any decision towards any cosmetic dentistry. They must consider the nature of the process, benefits, costs, results. For this, this study will concentrate on smile improvement, costs and dentist capability. The woman approach towards improving her smile is a planned behavior that depends on intention which is affected by social factors and situations, awareness of benefits, costs and the dentist. For that, this study will be based on adaptation of planned behavior theory which was developed by Ajzen in 1985 (1).

The theory of planned behavior, developed by Ajzen in 1985 (1), is an explanatory model that has been widely applied in diverse studies on behavioral intention
The theory states that attitude toward behavior, subjective norms, and perceived behavioral control, together shape an individual’s behavioral intentions and behaviors.

**Previous studies and hypotheses development**

Schmidt et al in 2003 (10), indicated in his study, concerning spontaneous face expressions that the smile considered to be one of the most important human face expressions which supports reward value for the attractive face. Goldstein in 1969 (11) finds, in his study, that smile comes in the second degree after eyes and considered to be the basic advantage that affects face attraction. Attractive smile helps to win elections and sell products for companies.

Cheng and Cheng in 2017 (12), indicate that smile is one of the most important expressions among face expressions in human that supports reward value for attractive face. Face attraction plays a major role in social interaction, character evaluation, performance and employment horizon (13).

The smile plays an important role in face expression and the look and smile represents face expressions that indicate to cordiality, agreement and appreciation. Distinctive and attractive smile leaves an impression in others. Those who have an attractive smile excite or inflame interest or the desire to smile. Teeth appearance proved that it affects other judgment for attraction of a person face beside the personal characters like quite, joy and relaxation (14,15).

Shavi et al in 2013 (16), explains in his study, smile analysis in Haryanavi females, that people who own attractive smile got a bigger chance to success and social acceptance, because the un-harmonious smile reduces face beauty and may cause un comfortability in social and professional life while the happy smile represents a harmonic relation between teeth and the lips.

The women will do their best to hide any defects in the teeth. In fact this is the main motive for women to look for dentist, that is, to gain attractive smile. They will look for information from different resources like relatives, friends, social media, celebrities’ photos, actresses and others whom they publish their photos on social media like Facebook and the comments of other users (17).

The study of Ahrari et al in 2015 (18), concluded that face attractiveness, including teeth and smile beauty, influences on social reactions and on self-concept, psychological welfare and social behavior. Persons, who are more attractive, are more successful in school, employment interviews and even in selection of their partners (19).

No doubt, smile provides face with great beauty attraction which plays a major role in influencing the social interactions of a person, belonging to the group, acceptance from others, beside its effect on “being” or “self” concept and social behavior (20). The objective from dental treatment, like dental implants or orthodontics appliances, is smile improvement (21).

Worldwide, smiles are known and evaluated as friendly. The real smile, that express person internal feeling, considered an indicator to acceptance and warm. Women, who have shining and friendly smile, will have less level of despair and sadness, say after 30 years, than their study colleagues (22).

Al Taki et al in 2017 (23) mentions that smile is a remarkable express in the face distinguished and it used as efficient tool for the social interaction.

Piete et al in 2007 (13), mentions that he underpins the psychosocial importance and the dental significance of an attractive smile. When a woman realizes that she is facing a problem by un-satisfaction of her smile, and the feeling of social and psychosocial pressures, then she starts to collect data about smile types by consulting the reference groups and the media, then according to this information she shall take the proper decision to improve the smile (24).

**Attitude**

Attitude is a disposition to respond a positive or negative toward the object (25).

**H1. Attitude has a negative effect on the attention**

Subjective norm is defined as any social influence that may determine if the individual performs or does not perform the behavior (26,27).

**H2. Social norm has a negative effect on the attention**

Perceived behavioral control is defined as the level of confidence an individual has about their ability to
perform the behavior based on how easy or difficult they perceive its performance as it relates to hindrances or facilitators (26, 27).

H3. Perceives has a negative effect on the attention

Cost

In spite of many women are seeking to improve the smile, aiming to gain an attractive look and achieve the benefits that will achieve satisfaction to them, psychological stability and social interaction, but costs are the decisive and final factor in making this decision.

Dental care request is the most health care types that are effected by prices, because patients, usually, sensitive towards prices (28, 29).

H4: Cost has a negative effect on the attention

Dentist

Dentist is the basic motive and the actual provider for the service of dental health care due to his distinguished knowledge, capabilities and skills that fit and match his job nature.

Dentist capability and services quality that he provides play a major role in attracting patients to request dental health care and provide services of very high quality (30, 31, 32).

H5. Dentist has a negative effect on the attention

The intention

The intention is the immediate antecedent of actual behavior and the relative degree of influence that attitude, subjective norm, and perceived behavior control have on intention may vary in significance by population and behavior studied (33, 34, 35, 36).

H6. Intention has a negative effect on the behavior

STUDY METHODOLOGY

We tested our hypotheses by using the collected data returned from applying the questionnaire on sample of 420 women who have smile improvement, where (420) copies of the questionnaire were distributed for women, and (367) were returned and valid for analysis, which is 87%.

Data analyses

Test of Reliability

A reliability coefficient of (Cronbach’s Alpha) 70% or higher is considered “acceptable” in most social science research situations. The result of this test in the current study is 72%

The structural model and the hypothesized relationships were tested by using Amos analysis

Table (1) Person correlation coefficient

<table>
<thead>
<tr>
<th></th>
<th>h1attitud</th>
<th>h2socia</th>
<th>h3perceived</th>
<th>h4cost</th>
<th>h5dentist</th>
<th>h6intention</th>
</tr>
</thead>
<tbody>
<tr>
<td>h6 intention</td>
<td>Pearson Correlation</td>
<td>.199**</td>
<td>.123*</td>
<td>.131*</td>
<td>.127*</td>
<td>.215**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.018</td>
<td>.012</td>
<td>.015</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>367</td>
<td>367</td>
<td>367</td>
<td>367</td>
<td>367</td>
</tr>
</tbody>
</table>

Fig1: Results of the structural model
RESULTS

The Person correlation coefficient

There are positive correlations between Attitude, Social, Perceived, Cost, Dentist and Intention and the results show that the dentist has most significant effect on intention with correlation 2.15** and Sig 0.000

Table (2) The Correlations between the intention and the behavior

<table>
<thead>
<tr>
<th>h6 intention</th>
<th>h7 behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>367</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
There is positive correlations between intention and behavior

Table (3) Model Summary ANOVA

<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>df</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.263*</td>
<td>.069</td>
<td>.056</td>
<td>.62495</td>
<td>5</td>
<td>5.355</td>
<td>.000b</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), h5dentist, h2social, h3perceived, h4cost, h1attitude

The results of the table confirm the validity of the multiple linear regression model, where the calculated F value is 5.355, which is greater than the table value of 2.26, and the value of Sig is 0.000, indicating that there is an effect of the independent factors on the intention of the Woman to improve the smile. The value of R Square indicates that the independent variables (position, cognition, social factor, cost, and dentist) explain what (.056) of the changes that affect the intention of the mirror to improve the smile

Table (4) Model Summary ANOVA

<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>df</th>
<th>F</th>
<th>B</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.298*</td>
<td>.089</td>
<td>.086</td>
<td>.49478</td>
<td>1</td>
<td>35.495</td>
<td>.240</td>
<td>5.958</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), h6intention

Dependent Variable: h7behavior
The results of the table confirm the validity of the multiple linear regression model, where the calculated F value is greater than the table value 3.89, and the Sig value is 0.000, indicating that there is an effect of the intention on the behavior of the mirror to improve the smile, Square suggests that the intention is to explain what it is (.089) of the changes that affect the behavior of the woman to improve the smile

**CONCLUSION AND DISCUSSION**

The current study applied the theory of planned behavior to examine the factors influencing Woman behavior to improve the smile. In the absence of previous studies on the subject. Since existing studies examining this issue are limited, the present study can contribute in providing a better understanding of the factors influence the woman behavior to improve the smile in Iraq.

The main findings of this study indicate that all independent factors have a positive relationship with the intention to improve the smile and that the strongest relationship is between the dentist and the behavioral intention and the relationship between the behavior and intention positive relationship also.

The results indicate that the value of F is 5.355 and the sig is 0.000. This indicates that there is an effect of the independent factors on the behavioral intention of the woman to improve the smile. The F value is 35.495 and the sig is 0.000 which indicates the effect of the intention on the behavior of the woman to improve the smile

The results revealed significant relationship of five factors behavioral intentions, and significant relationship between the behavioral intentions and behavior of woman to improve the smile. This is consistent with the theory of planned behavior.

**Ethical Clearance:** Not required

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**

3. Christensen, G.J. Are prosthodontics a vital part of dentistry, 133: Journal of the American Dental Association; 2002.
15. Rehman, K.; Khan, F.R. and Rahman, M. Asseing the perception of smile attractiveness in young
CD4⁺ Cell Impacts of Orally Red Fruit (*Pandanus conoideus*) Oil Extract in HIV Patients with Antiretroviral Therapy

Titus Tambaip¹,², Marni Br Karo³, Rosdiana Natzir⁴, Maria Bintang⁵, Andi Asadul Islam⁶, Wa Ode Salma⁷, Mochammad Hatta⁸

¹Midwifery Program of Yaleka-Maro School, Merauke-Papua, Indonesia, ²School of Post Graduate, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia, ³Midwifery Program of Medistra Health Higher School, Jakarta, Indonesia, ⁴Department of Biochemistry, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia, ⁵Department of Biochemistry, Bogor Agricultural University (IPB), West Java, Indonesia, ⁶Department of Neurosurgery, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia, ⁷Department Nutrition, Faculty of Medicine, Halu Oleo University Kendari Indonesia, ⁸Molecular Biology and Immunology Laboratory for Infectious Diseases, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia

ABSTRACT

Background and Objective: The efficacy of red fruit (*Pandanus conoideus*) oil extract on CD4⁺ cells was evaluated in HIV infected patients with taking antiretroviral therapy. Materials and Method: Seventy patients with an age of 17-45 years, with confirmed HIV infection with a CD4 count of 200-349 cells/μL, were divided into the antiretroviral (ARV) control (n = 35) and the antiretroviral + red fruit capsule (ARV+RFC)-treated (n = 35) groups. In ARV+RFC group, they were given oral RFC (1 g daily for two months). Monitoring evaluations of the laboratory were performed at baseline (0 months) and two months during the study. Results: The result showed that the CD4⁺ cells count was increased in the patient who took ARV+RFC compared with ARV alone (P<0.05). Conclusion: By these result, it can be concluded that the red fruit oil extract may have an excellent immunomodulatory impact and has potential as an adjuvant in the management of HIV patients.

Keywords: Antiretroviral therapy, CD4⁺ cell, HIV/AIDS, Immune, Pandanus conoideus

INTRODUCTION

The acquired immune deficiency syndrome (AIDS) is an infectious disease caused by a virus namely human immunodeficiency virus type 1 (HIV-1) ¹,². This disease remains a global public health problem with an estimated 690,000 people living with HIV in Indonesia area in 2015 ³. The prevalence of HIV infection and AIDS of Papua Province was higher than another province of Indonesia ⁴. In the Merauke District of Papua Province of Indonesia, the prevalence of HIV/AIDS has become a severe problem. In 1992-2017, the total number was 1,063 people living with HIV in Merauke Regency, 902 people had AIDS, and 537 died due to AIDS-related causes ⁴. The populations of people HIV/AIDS include direct and indirect high-risk men, transgender people, female sex workers, people who inject the drug, and men who have sex with men ⁵.

Nowadays, antiretroviral therapy (ARV) was successful alternative treatment in people infected with human immunodeficiency virus (HIV) ⁶, ⁷. However, there were limited to ARV treatment in patients HIV/AIDS about by some factors, which include drug resistance ⁸-¹⁰, toxicity ¹¹, drug-drug interaction ¹² and drug-food interaction ¹³. Other than that ARV treatment required lifelong use, failed treatment response, the optimal time to start treatment and switching regimens ¹⁴. Therefore, management of patients HIV/AIDS are required to reduce the negative impact and improved impact the efficacy of highly active antiretroviral treatments.

Numerous herbal medicines are being used in combination with ARV treatment to improve the efficacy of HIV/AIDS therapy. The metabolite compounds of
medicinal plants have been the most successful source of potential traditional medicine\textsuperscript{15-21} and also can be used as an alternative for an interaction with antiretroviral therapy in patients HIV/AIDS\textsuperscript{22}. Larson et al.\textsuperscript{23} reported that the combination medicinal plant extracts from Papua New Guinea with ARV exhibited alter the concentration of antiretroviral drugs in the body and their efficacy. Another literature showed that medicinal plant extracts were considered as an excellent source for management of HIV/AIDS patients\textsuperscript{24}.

The red fruits (\textit{Pandanus conoideus}), namely Buah Merah in Indonesia, is a plant in the family Pandanaceae\textsuperscript{25}. It is an endemic plant that easily found in Papua regions of Indonesia and has been used as a traditional herb Papua community to treat cancer, rheumatoid arthritis, stroke, and HIV/AIDS\textsuperscript{26}. Some other pharmacological activities that have been reported in recent years include its anti-inflammation and anticancer\textsuperscript{27,28}.

In the current work was investigated the clinical efficacy of red fruits (\textit{Pandanus conoideus}) oil extract in HIV infected patients with taking antiretroviral therapy. This working point to the potential of developing red fruits oil extracts for management HIV infected patients.

**MATERIALS AND METHOD**

**Study Location and Design**

Recruitment and drug administration took place in Merauke Hospital, Merauke Regency of Papua Province, Indonesia. Laboratory tests were performed at a Molecular Biology and Immunology Laboratory for Infectious Diseases, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia.

In this work, ethical clearance was obtained from Hasanuddin University of Medicine Faculty Research Ethics Committee (532/H4.8.4.5.31/PP36-KOMETIK/2017) before data collection commenced. The study was conducted in randomized controlled groups. Patients qualified for inclusion in the study were ambulatory, with the base CD4 line was between 200-349 cells/\mu L, the body weight of 45-70 kg and treated with ARV. Excluded were pregnant women and kidney failure, body weight under than 45 kg and no treated ARV in three months.

**Study Medication and Monitoring**

Seventy HIV-infected patients of either gender aged between 17 and 45 years were selected in this study. The patients were divided into the ARV (antiretroviral) control (n = 35) and the antiretroviral + red fruit capsule (ARV+RFC)-treated (n = 35) groups. RFC gelatin (1000 mg red fruit extract per capsule) was administered to the patients. The dosage was 1000 mg (one capsule) daily for two months. Monitoring evaluations of the laboratory were performed at baseline (0 months) and two months during the study.

**CD4\(^+\) Cells Count**

The efficacy determinations were the change from baseline (0 months) to month 2 in the CD4\(^+\) cell count. CD4\(^+\) cell counts were determined using Human CD4 ELISA Kit (Catalog No. LS-F11086, LSBio, LifeSpan BioSciences, Inc.).

**Statistical Analysis**

All data of results were analyzed by SPSS statistical software 16.0 (SPSS Inc., Chicago II, USA) and comparison ANOVA was used with considered significant at p < 0.05.

**RESULTS AND DISCUSSION**

A total of seventy HIV-infected patients participated in the research and were completed CD4\(^+\) cell counts at baseline and final time points. There was a gradual increase in the mean CD4\(^+\) cell counts from 71.78 (11.74-164.12) cells/\mu L at baseline to 123.62 (28.49-217.61) cells/\mu L after two months treatment of RFC (Figure 1). In ARV group showed that a lower increase in the mean CD4\(^+\) cell counts from 83.90 (16.43-153.87) cells/\mu L at baseline to 96.15 (18.24-222.45) cells/\mu L after two months therapy. A significant increase (P<0.05) in the mean CD4\(^+\) cell counts was observed in patients treated with ARV+RFC for two months (52.16\%) when compared to control ARV (12.24\%). These results indicated that the application of ARV+RFC could be an enhancement of the immune status of the patients compared with ARV only. Thus, red fruit has potential as an adjuvant in the management of HIV patients. This study can be completed information on previous research in the application of red fruit oils extract for improved immune systems\textsuperscript{28}. This research evaluated the efficacy of red fruit oils extracts in HIV-infected patients. The efficacy effect of red fruit oils extract was probably derived from its bioactive compounds, one of which is carotenoid\textsuperscript{25}. Carotenoid has been widely studied and
has been shown to possess anti-cancer, antioxidant, as well as immunomodulatory capacity. As an immunomodulator, carotenoid has been shown enhance lymphocyte blastogenesis, increase the population of specific lymphocyte subsets, increase lymphocyte cytotoxic activity, and stimulate the production of various cytokines.

Results showed that CD4+ cell counts in ARV+RFC treatment were significantly increased in HIV-infected patients as compared to ARV controls (123.62 cells/μL vs. 83.90 cells/μL, respectively). Results indicated that red fruits extract oils functional as immunostimulants; because the CD4+ cell counts reflect the immunologic status of HIV-infected patients. Thus it is possible that the functional interaction of red fruit extract oils with antiretroviral therapy as an immunostimulant in HIV-infected patients occur at the level metabolism through enzyme induction or inhibition. Another possible mechanism that metabolite constituents of red fruits extract oils remedies may affect ARV metabolism as a result of their efflux drug transporter systems.

CONCLUSION

In conclusion, our study shows that the increased level of CD4+ cells count by ARV+RFC was provide positive benefits in HIV/AIDS therapy.

Conflict of Interest - We declare that we have no conflict of interest.

Ethical Clearance – Taken from Hasanuddin University of Medicine Faculty Research Ethics Committee (532/H4.8.4.5.31/PP36-KOMETIK/2017).

Source of Funding - This research was supported by “Beasiswa Pendidikan Pascasarjana Dalam Negeri” from the Ministry of Research Technology and Higher Education of the Republic of Indonesia.

REFERENCES


6. Roncero C, Fuster D, Palma-Álvarez RF, Rodriguez-Cintas L, Martinez-Luna N, Álvarez FJ. HIV And HCV infection among opiate-

Figure 1 CD4 cell count response of ARV (antiretroviral) control and ARV+RFC (red fruit capsule)- treated in the baseline (a), two months (b), and mean change (c). *p<0.05 vs. ARV control.
25. Sarungallo ZL, Hariyadi P, Andarwulan N, Purnomo EH, Wada M. Analysis of


Effect of Iron Overload on Some Physiological and Biochemical Variables in Immature Female Rats

Wasan S. Sarhan, Raouf M. Fadhil, Alyaa S. Jawad

1Lecturer, 2Assistant Lecturer, College of Veterinary Medicine/ Department of Physiology and Chemistry and Pharmacology, Iraq, 3Assistant Lecturer, AL-dour Technical Institute, Iraq

ABSTRACT

The current study was conducted to investigate the effect of (100 mg / kg b.w) on the weight of some organs (liver, heart, spleen, kidneys, ovaries, and uterus) and some physiological and biochemical parameters in immature female rats at the weaning age (22) days, the experimental animals were divided into two groups, the first group included (10) females were gave the solution of iron sulfate daily by mouth for 14 days, and the second group included (10) females were treated naturally and considered as a control group. The results of the iron treatment showed a significant increase (P ≤0.05) in weight of the liver and spleen, and a significant decrease in body weight, while no significant difference was observed in the weight of the heart, kidney, ovaries and uterus. While in the physiological and biochemical parameters studied, the results showed a significant increase in the level of malondialdehyde, the concentration of hemoglobin (Hb), packed cell volume (PCV), and iron level, with a significant decrease in the level of glutathione compared to control group. It is concluded that iron has harmful effects on studied parameters and organs, indicating that iron is stressful and has a negative effect if it increases over the normal level.

Keywords: iron overload, physiological criteria, immature female rats, oxidative stress, body weight.

INTRODUCTION

Pollution is a common problem at present, and the world around us is saturated with polluting substances, such as those used in the environment by humans as well as many naturally occurring substances such as vapors rising from active volcanoes, similar to pollution from raw materials, factories, human and sewage products. [1] The evolution of the world and the geological changes in the earth crust have led to changes in the distribution of essential soil elements such as iron, zinc, copper, selenium, molybdenum, manganese, chromium, cobalt and iodine. [2] These elements are widely dispersed in the environment either through their natural presence or as industrial wastes. Human and animal species are exposed to these minerals from various sources, including air, soil, water and contaminated food. [3] Exposure to these minerals causes many functional disorders, including loss of fertility for many reasons; one of it is the increase of iron ratio in the body (iron overload) or iron deficiency. [4] Transitional metals (such as iron) are catalysts in the oxidation reactions in living organisms. Therefore; the damage caused by these minerals appears in the tissues as oxidative damage. The most affected organs are the liver, kidneys, and testicles, these effects include dehydration, low body weight, loss of appetite, renal tubules necrosis and pulmonary hemorrhage. [5]

Excessive iron administration increases the amount of free iron that collected in the body and then participates in the Finton reaction, leading to the generation of active oxygen species, causing damage to the cells and tissues of the body as well as attacking the embryos in the of pregnancy and causing severe oxidative damage. The oxidative damage caused by free radicals due to excessive iron inside the body, is a clear indication of the body’s access to the state of poisoning that has a negative impact on human health. [6]

The current study aims to

1- Investigation the effect of iron on some blood variables by measuring the: level of hemoglobin (Hb), the packed cell volume of blood (PCV), the level of iron blood serum.

2 - Detection of the negative effects caused by
the free radicals stimulated the iron formation in the immature female rats.

**MATERIALS AND METHOD**

In this study, 20 immature female albino rats were used at the age of 22 days. Their weights ranged from (30 - 45 g). They were raised in the animal house in the college of the Veterinary Medicine / University of Tikrit. The animals were subjected to laboratory conditions represented by temperature (5 ± 25 °C), with light cycle (10) hours and (14) dark hours. The animals were kept in plastic hutch with a diameter (20 × 25 × 20 cm) and then divided into two groups, each group included (10) animals. The first group was treated with (100 mg / kg b.w) of ferrous sulphate solution in a daily dose for 15 days orally through tubular feeding, while the other group considered as a control group, and then the animals were killed at the age of 37 days.

**The Weight of internal viscera and genitals**

Animals were anesthetized using a special glass vessel containing ether-saturated cotton. The weight of the animals was recorded prior to the killing. The abdominal cavity was opened with forceps and scissors, the opening continued until the thoracic cavity reached the internal organs quickly. The internal organs, which included the liver, heart, spleen and kidneys, ovaries (right and left), and uterine, were extracted. After cleaning these organs from the surrounding tissue and by using a sensitive electrical balance, the weight of these organs was weighed.

**The variable studied:**

Determination the level of glutathione in the blood serum

The level of glutathione was estimated using the modified method used by Rifai (2018). [7]

Determination the level of malondialdehyde in the blood serum

The serum lipid peroxidation level was assessed by measuring the level of malondialdehyde (MDA) as a final product of over-oxidation fat. [8]

Determination packed cell volume of the blood (PCV)

PCV was estimated according to Guyton, (2006)

<table>
<thead>
<tr>
<th>variables</th>
<th>Mean ± standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>Iron treatment group</td>
</tr>
<tr>
<td>Body weight (gm)</td>
<td>97.64 ± 3.37</td>
</tr>
<tr>
<td>Liver weight (mg)</td>
<td>347.67 ± 142.81</td>
</tr>
<tr>
<td>Spleen weight (mg)</td>
<td>698.83 ± 15.64</td>
</tr>
<tr>
<td>Heart weight (mg)</td>
<td>496.83 ± 23.84</td>
</tr>
<tr>
<td>Kidney weight (mg)</td>
<td>413.33 ± 9.82</td>
</tr>
<tr>
<td>Ovary weight (mg)</td>
<td>12.16 ± 0.61</td>
</tr>
<tr>
<td>Uterine weight (mg)</td>
<td>44.17 ± 1.92</td>
</tr>
</tbody>
</table>

**THE RESULTS**

Table (1) shows the effect of oral iron sulfate on body weight, heart, kidney, spleen, liver, ovaries, and uterus (mg) in female immature rats.
Horizontal different letters mean that there is a significant difference between groups at a significant level (P < 0.05).

Number of animals in each group = 10

Table (2) shows the effect of oral iron therapy on the level of malondialdehyde, hemoglobin concentration, packed cell volume (PCV), level of iron and glutathione in immature adult rats.

<table>
<thead>
<tr>
<th>variables</th>
<th>Mean ± standard error</th>
<th>Iron treatment group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum glutathione level (µmol/l)</td>
<td>Control group</td>
<td>Iron treatment group</td>
</tr>
<tr>
<td></td>
<td>5.12 ± 0.08</td>
<td>3.14 ± 0.13</td>
</tr>
<tr>
<td></td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>MDA level (µmol/l)</td>
<td>Control group</td>
<td>Iron treatment group</td>
</tr>
<tr>
<td></td>
<td>0.32 ± 0.01</td>
<td>0.97 ± 0.02</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>a</td>
</tr>
<tr>
<td>Hb (gm/100ml)</td>
<td>Control group</td>
<td>Iron treatment group</td>
</tr>
<tr>
<td></td>
<td>11.12 ± 0.15</td>
<td>14.23 ± 0.17</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>a</td>
</tr>
<tr>
<td>PCV (%)</td>
<td>Control group</td>
<td>Iron treatment group</td>
</tr>
<tr>
<td></td>
<td>39.72 ± 0.54</td>
<td>44.22 ± 1.49</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>a</td>
</tr>
<tr>
<td>serum iron level (µgm/ml)</td>
<td>Control group</td>
<td>Iron treatment group</td>
</tr>
<tr>
<td></td>
<td>175.01 ± 2.24</td>
<td>242.84 ± 3.38</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>a</td>
</tr>
</tbody>
</table>

Horizontal different letters mean that there is a significant difference between groups at a significant level (P < 0.05).

DISCUSSION

The current study showed that given the iron at dose (100 mg/kg of body weight) caused a significant decrease in body weight, and this result came correspondent with the findings of Han (2011) [10] who pointed out that rats exposed to iron overload are susceptible to anorexia, which may be due to the irregular physiological functions of the body as well as the effect of iron overload on the absorption of food from the intestines. The result was identical to that indicated by Garibay (2011) [11] who observed a significant decrease in body weight in iron-treated animals excessively compared to control group, this was attributed to the fact that giving high doses of iron causes loss of appetite and then to the weight loss.

The results of this study showed a significant increase in the weight of the liver and spleen, this result was agreed to that of Sharaf, (2002) [12] which indicated a direct relationship between the weight of the liver and spleen on the one hand and dietary iron content on the other hand; as the liver and spleen are the most organs affected by the quantity of Iron in the body and this may explain the moral increase in the weight of these two organs due to the iron overload in experimental animals. However, this result was contrary to the results of by Eybl, (2011). [13] which did not record a relationship between the weight of the liver and spleen and the body iron level on the other hand, this result was consistent with that indicated by Stal, (1999) [14] that the rats treated with heavy metals suffered from a rise in the weight of the liver and spleen and he attributed that to the decrease of liver glutathione level; due to the lack of antioxidant enzymes in it and then the occurrence of oxidative damage, and functional disorder of the liver, and may be due to what pointed out by Stohs, (1999) [15] that the site of the main collection of iron in the body is the liver and the spleen, and the iron is responsible for cases of oxidative damage in each, this is confirmed by studies that patients exposed to iron overload suffering from hepatic cell damage.[16]

The significant increase in the weight of liver and spleen in the iron treatment group was corresponding with the findings of Karaca, (2010) [17] which indicated that this increase may be due to increased inflammatory processes in those organs as iron is an oxidative component and catalyst of this inflammatory processes at the same time, and that the liver and spleen are one of the main centers of the presence of iron in the body so the cause of iron overload doubling inflammatory processes, which ends with an increase in weight in these two organs. The small age of animals in this group may be helpful in increasing the inflammatory processes that occur within the body due to the high level of free radicals and the consequent increase in the rates of oxidative damage; due to the low efficiency of anti-
Treatment with iron showed no significant difference in heart, kidney, ovary, and uterine weight compared with the control group. This result was agreed with Chandra, (2011). [18], which indicated that the exposure of immature rats to heavy metals did not cause a significant increase in heart, kidneys, testis weight, and subsequent sexual glands and growth in pre-puberty age are affected by the secretion of sex hormones, which begin to secrete at puberty. Sex hormones work on the retention of nitrogen, which is involved in the manufacture of amino acids and proteins, so no significant difference in weight at these ages. It may also be due to the shortening of the period of the dosage which is (14) days so that the iron cannot show the negative effects during this period to those values [17]. The treatment with iron showed a significant decrease in the level of glutathione in the blood serum. The result was consistent with 14-Stal, (1999) [14], which observed "a decrease in the level of glutathione in rats treated with heavy metal"; as a result of the lack of antioxidant enzymes. The synthesis of active oxygen species by non-enzymatic reactions of iron with the thiol groups in plasma leads to a reduction in the ability of total antioxidants (catalase and superoxide dismutase) in plasma, as well as the treatment with iron significantly increased the level of malondialdehyde, and this result was consistent with Girotti, (1994). [19], which indicated “that the treatment of rats with heavy metals led to an increase in lipid peroxidation and a decrease in antioxidant enzymes”. As the cellular membranes are rich in unsaturated fats, which is a major target for effective oxygen varieties, in addition, effective oxygen varieties are responsible for breaking down most of the main proteins involved in cell formation as well as reducing the levels of antioxidants.

Iron ion has the potential to facilitate the modification of hydrogen peroxide (H2O2) to the hydroxyl root through Fenton reaction, which is believed to be an important initiator for lipid peroxidation [20], the increase in the level of malondialdehyde is an important indicator of the increase in free radical which causes increase in the lipid peroxidation, which is the final product of it is the malondialdehyde. [21]

The results obtained showed a significant increase in the level of hemoglobin (Hb), the packed cell of blood (PCV), and the level of iron blood serum. This result was agreed with the findings of Rincker, (2012). [22], “which confirmed a significant increase in hemoglobin in the case of continuous exposure to nutritional iron, which stimulates the synthesis of Hb, also he indicated” that the concentration of hemoglobin was directly proportional to the PCV”, also he indicated “that the increase in iron leads to a decrease in the concentration of serum transferrin, which coincides with the high levels of hemoglobin synthesis” this decrease in the transferrin concentration; is due to the reduction of iron transport from its storage sites to the sites of the hem synthesis, and this is why the rise of iron liver and spleen in the iron overload.

CONCLUSIONS

It is concluded that iron overload has harmful effects on studied parameters and organs, indicating that iron is stressful and has a negative effect if it increases over the normal level which produce oxidative condition.

Conflict of Interest: Nil.

Source of Funding: Self.

Ethical Clearance: We have not collected any samples from humans.

REFERENCES

16. Bodiga, S. Concurrent repletion of iron and zinc reduces intestinal oxidative damage in iron- and zinc-deficient rats. 2012,World J.Gastroentero .13(43): 5707-5717
Assessment of Learning Disabilities among Deaf Adolescent

Wameedh Hamid Shaker
Lecturer, University of Kufa / faculty of Nursing / Head of pediatric Nursing Branch

ABSTRACT

Objective: To assess learning disabilities among deaf adolescent. To find association between sociodemographic and learning disorder of deaf adolescent. Methodology: A cross sectional descriptive design was carried out through the present study in order to achieve the early stated objectives for period from February 2016 to March 2017. Conclusion the majority of the study sample was male. The study subjects have 12-14 for age was exceedingly and result study was residence mostly rural. Level of education for father and mother was generally primary school. The economic status was good during study, behavioral characteristics that most affect. Overall evidence of research on the prevalence of additional disabilities with deafness is very low. Recommendation needs to be made here is that a comprehensive research program focusing on deaf adolescent with multiple disabilities is very much needed. Data provide the basis for recommendation of a battery of tests for use by school, professional, and general psychologists in evaluating deaf adolescent

Key wards: Assessment, Learning, Disabilities, Deaf, Adolescent.

INTRODUCTION

Deaf and dumb the term deaf is frequently applied to those who are deficient in hearing power in any degree, however slight, as well as to people who are unable to detect the loudest sounds by means of the auditory organs. It is impossible to draw a hard and fast line between the deaf and the hearing at any particular point.

Mentioned National Deaf Children’s Society November (2012) known the incidence rates of lasting childhood hearing weakening for children in the Trent area. Study is identify 38.7% of the children were institute to have another clinical or developmental problem and half of these children had at least two additional problems. Since then there have been major developments in the technology used to assess deafness, with objective measures in place allowing for hearing testing from birth. In England, the newborn hearing screening program offers 99.9% of babies born a hearing screening test within the first few weeks of birth.

Deafness is either congenital or acquired. Congenital deafness arises from some natural cause which deprives the child of hearing from its birth. Acquired deafness arises from disease, accident, or other causes. The deaf are divided into two classes the totally deaf, and the partially deaf the latter being subdivided into five classes.

Those who perceive the human voice when it is used close to the ear, without being able, however, to distinguish the separate sounds, by those who can distinguish the vowels when they are loudly pronounced in the ear; those who understand (but with difficulty) some words known to them when these are clearly pronounced in their ear. Without effort, understand all that is clearly pronounced in their ear; and finally those who can hear the raised voice, but not sufficiently well to follow general conversation, or to attend to what is going on in a class of hearing children. All those coming within this division are fit subjects for schools for the deaf and dumb.

Statement of problem:

Assessment of Learning Disabilities among Deaf Adolescent in AL-Amal Center of Al-Najaf Al- Ashraf Governorate

The study aims:

1- To assess Learning Disabilities among Deaf Adolescent.
2- To find association between sociodemographic and learning disorder of Deaf adolescent.

**Methodology:** A cross sectional descriptive design was carried out through the present study in order to achieve the early stated objectives for period from February 2016 to March 2017.

**Design of the study:** A cross sectional study descriptive design was conducted. Each individual in the sample was interviewed using a specific questionnaire form.

**Setting of the study:** The study was conducted at AL-Amal Center of Al-Najaf Al-Ashraf Governorate.

**The sample of the study:** The Simple purposeful sample of (60) Assessment of Learning Disabilities among Deaf Adolescent in AL-Amal Center.

**RESULTS**

Table (1): The Statistical distribution of study group by their Socio-Demographic Data

<table>
<thead>
<tr>
<th>Items</th>
<th>Sub-groups</th>
<th>Study group Total = 60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Age / Years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-14</td>
<td>41</td>
<td>68.3</td>
</tr>
<tr>
<td>15-17</td>
<td>19</td>
<td>31.7</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>34</td>
<td>56.7</td>
</tr>
<tr>
<td>Female</td>
<td>26</td>
<td>43.3</td>
</tr>
<tr>
<td>Residency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>22</td>
<td>36.7</td>
</tr>
<tr>
<td>Rural</td>
<td>38</td>
<td>63.3</td>
</tr>
<tr>
<td>Level Education of father</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>17</td>
<td>27.7</td>
</tr>
<tr>
<td>read and write</td>
<td>14</td>
<td>23.3</td>
</tr>
<tr>
<td>Primary school</td>
<td>17</td>
<td>28.9</td>
</tr>
<tr>
<td>Secondary school</td>
<td>7</td>
<td>11.7</td>
</tr>
<tr>
<td>Institute or College</td>
<td>4</td>
<td>6.7</td>
</tr>
<tr>
<td>Higher studies</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Level Education of mother</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>11</td>
<td>18.3</td>
</tr>
<tr>
<td>read and write</td>
<td>10</td>
<td>16.7</td>
</tr>
<tr>
<td>Primary school</td>
<td>26</td>
<td>43.3</td>
</tr>
<tr>
<td>Secondary school</td>
<td>8</td>
<td>13.3</td>
</tr>
<tr>
<td>Institute or College</td>
<td>5</td>
<td>8.3</td>
</tr>
<tr>
<td>Higher studies</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Economic Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>35</td>
<td>58.3</td>
</tr>
<tr>
<td>Not good</td>
<td>25</td>
<td>41.7</td>
</tr>
</tbody>
</table>

Table (1) shows statistical distribution of patients group by their socio-demographic data, it explains that the majority of the patients subgroup are: patients with ages between (12-14) years old (68.3%), male patients (56.7%), those who live rural residents (63.3%), and finally those with good economic status (58.3%) the level of education father was Primary school (28.9) % and level of education mother was primary school was (43.3%).
Table (2) The mean of scores and assessment of behavioral characteristics for study group

<table>
<thead>
<tr>
<th>Behavioral characteristics</th>
<th>mean of scores</th>
<th>Stander division</th>
<th>Assessment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>attention easily distracted</td>
<td>2.87</td>
<td>1.07</td>
<td>Failure</td>
</tr>
<tr>
<td>Impulsive</td>
<td>2.63</td>
<td>1.20</td>
<td>Failure</td>
</tr>
<tr>
<td>Famous to the point of folly</td>
<td>3.17</td>
<td>1.38</td>
<td>Pass</td>
</tr>
<tr>
<td>Behavior difficult to predict</td>
<td>3.35</td>
<td>1.33</td>
<td>Pass</td>
</tr>
<tr>
<td>cannot control himself (speaking without ear, jumping from a chair, etc.)</td>
<td>2.80</td>
<td>1.45</td>
<td>Failure</td>
</tr>
<tr>
<td>Intensive</td>
<td>2.57</td>
<td>1.26</td>
<td>Failure</td>
</tr>
<tr>
<td>Always rude with others</td>
<td>3.62</td>
<td>0.98</td>
<td>Pass</td>
</tr>
<tr>
<td>movement cannot stabilize</td>
<td>2.78</td>
<td>1.11</td>
<td>Failure</td>
</tr>
<tr>
<td>Very easily consulted other children</td>
<td>3.17</td>
<td>1.11</td>
<td>Pass</td>
</tr>
<tr>
<td>behavior often does not suit the attitude</td>
<td>3.38</td>
<td>1.02</td>
<td>Pass</td>
</tr>
<tr>
<td>Furious and irritable</td>
<td>2.72</td>
<td>1.13</td>
<td>Failure</td>
</tr>
<tr>
<td>Moody</td>
<td>2.88</td>
<td>1.20</td>
<td>Failure</td>
</tr>
<tr>
<td>Global Mean of Score</td>
<td>2.99</td>
<td>1.19</td>
<td>Failure</td>
</tr>
</tbody>
</table>

This table shows the mean of scores and assessment of behavioral characteristics for study group, the statistical assessment considers any item (pass) when the mean of score is higher than the cut-off point for the mean of score (cut-off point = 3).

Table (3) The mean of scores and assessment of cognitive difficulties for study group

<table>
<thead>
<tr>
<th>Cognitive difficulties</th>
<th>M.S.</th>
<th>S.D.</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to remember the printed word</td>
<td>2.95</td>
<td>1.27</td>
<td>Failure</td>
</tr>
<tr>
<td>It is difficult for him to recognize letters and numbers</td>
<td>3.10</td>
<td>1.31</td>
<td>Pass</td>
</tr>
<tr>
<td>It lacks the ability to distinguish sizes</td>
<td>3.57</td>
<td>1.26</td>
<td>Pass</td>
</tr>
<tr>
<td>The ability to distinguish (right, left, up, below)</td>
<td>4.12</td>
<td>1.21</td>
<td>Pass</td>
</tr>
<tr>
<td>His ability to balance is very weak</td>
<td>3.82</td>
<td>1.01</td>
<td>Pass</td>
</tr>
<tr>
<td>Has a weak audio memory</td>
<td>1.85</td>
<td>1.30</td>
<td>Failure</td>
</tr>
<tr>
<td>He finds it difficult to distinguish sound stimuli</td>
<td>1.48</td>
<td>1.09</td>
<td>Failure</td>
</tr>
<tr>
<td>Its kinetic coherence is generally very weak</td>
<td>3.58</td>
<td>1.16</td>
<td>Pass</td>
</tr>
<tr>
<td>Has a weak visual memory</td>
<td>3.48</td>
<td>1.55</td>
<td>Pass</td>
</tr>
</tbody>
</table>
Cont... Table (3) The mean of scores and assessment of cognitive difficulties for study group

<table>
<thead>
<tr>
<th>Cognitive Difficulty</th>
<th>Score Mean</th>
<th>Standard Deviation</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>His ability to use his hands is very weak</td>
<td>3.87</td>
<td>1.13</td>
<td>Pass</td>
</tr>
<tr>
<td>Lack of skill in the performance of motor skills in general</td>
<td>4.03</td>
<td>0.87</td>
<td>Pass</td>
</tr>
<tr>
<td>He is able to listen but he does not understand what he hears</td>
<td>3.67</td>
<td>1.55</td>
<td>Pass</td>
</tr>
<tr>
<td>It lacks the ability to retrieve simple geometric shapes</td>
<td>3.65</td>
<td>1.18</td>
<td>Pass</td>
</tr>
<tr>
<td>Global Mean of Score</td>
<td>3.32</td>
<td>1.22</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Table shows the mean of scores and assessment of cognitive difficulties for study group, the statistical assessment considers any item (pass) when the mean of score is higher than the cut-off point for the mean of score (cut-off point = 3).

Table (4): the correlation between demographic data and behavioral characteristics for study group

<table>
<thead>
<tr>
<th>Demographic Items</th>
<th>Chi Square</th>
<th>Coefficient of Contingency</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.00</td>
<td>0.01</td>
<td>0.94</td>
</tr>
<tr>
<td>Gender</td>
<td>0.46</td>
<td>0.09</td>
<td>0.50</td>
</tr>
<tr>
<td>Residence</td>
<td>0.03</td>
<td>0.02</td>
<td>0.86</td>
</tr>
<tr>
<td>Economic Status</td>
<td>3.77</td>
<td>0.24</td>
<td>0.58</td>
</tr>
<tr>
<td>Level of education of father</td>
<td>2.19</td>
<td>0.19</td>
<td>0.70</td>
</tr>
<tr>
<td>Level of education of mother</td>
<td>0.00</td>
<td>0.01</td>
<td>0.94</td>
</tr>
</tbody>
</table>

This table shows the correlation between demographic data and behavioral characteristics for study group, it is clear from the table that there is no significant correlation; because the p-value is higher than 0.05, except for the residence which shows a significant correlation cognitive difficulties.

**DISCUSSION**

Discussion of study results will be presented in with assessment of learning disabilities among deaf adolescent.

In the current study show higher incidence in the age (12-14). Concerning the gender, the study results reveal that the majority of the subject are male, this study subject reveal the most of participant is male.

Their results indicate that the majority of subjects are rural residents rather than the big cities. Regarding fathers and mothers education level most of participant are Primary school. Their results indicate that the majority of study subjects are low monthly income.

The study result shows that the final assessment of academic difficulties and determination of cognitive patients domains are pass except the assessment of knowledge patient regarding behavioral domain is poor.

While the overall assessment for the patients knowledge regarding learning difficulties is good.

The study results show that there is a no significant relationship between academic behavioral and cognitive difficulties and their demographical data that mean the age, gender, residency, economic status and fathers and mothers level of education do not effect on their learning difficulties.

Assessments should also be go together with by observations of the integrity of the implementation of the intervention, including the amount of time paid on supplemental instruction, especially if the child does not appear to be making progress. School psychologists are often well organized in this area of assessment. Although a psychologist operating outside of a school may not be in a position to do curriculum-based assessments or to in my opinion evaluate the intervention, such assessments should be expected, especially if the referral is to a private academic therapist.

Impost of written expression is especially important
because it is the most common type of LD in clinical children and because writing problems are more common in general population studies in school students than are reading problems.

CONCLUSIONS

According to the present study findings, the researcher can make the following conclusions: Most of the sample male was majority; the study subjects have 12-14 for age was exceedingly. The result study was residence mostly rural, the level of education for father and mother was generally primary school. Economic status was good during study. The behavioral characteristics that most affect. Cognitive difficulties assessment was no affect. The correlation between demographic data and behavioral no significant correlation. The overall evidence of research on the prevalence of additional disabilities with deafness is very low.

Recommendations:

1-The recommendation that needs to be made here is that a comprehensive research program focusing on deaf adolescent with multiple disabilities is very much needed.

2-These data provide the basis for recommendation of a battery of tests for use by school, professional, and general psychologists in evaluating deaf adolescent.

Declaration of Interest: Nil.

Source of Funding: Self.

Ethical Clearance: After the approval of protocol by the Ethical Review Board, university of kufa/Iraq and before enrollment, all subjects gave their written informed consent.

REFERENCES


Evaluation of Drug Management Information System to Improve Quality and Users Satisfaction: Case Study at a Primary Health Center

Rico Kurniawan¹, Popy Yuniar¹, Tris Eryando¹, Kenji Fadlin Azimi², Retnowati², Devi Maryori³

¹Department of Biostatistics and Population Studies, Faculty of Public Health, Universitas Indonesia, 16424 Depok, Indonesia, ²Research Center for Biostatistics and Health Informatics Faculty of Public Health, Universitas Indonesia, 16424 Depok, Indonesia, ³City of Depok Health Office, 16424 Depok, Indonesia

ABSTRACT

Drug and supplies management plays an important role in health systems. A web-based drug management information system, Sistem Informasi Pengelolaan Obat (SIPO) was developed to support interaction and communication among the internal entities of a district health office (DHO), including primary health centers (PHC). Using a qualitative approach, the objective of this descriptive study is to assess SIPO’s performance in terms of success in addressing problems related to drug and medical supplies management. The results indicate that SIPO has a positive impact for both PHCs and the DHO. The result found that the users are satisfied with the system. One element that needs to be improved is integration ability; currently, SIPO cannot connect to other health-related information systems. Generally, SIPO is considered to have a positive impact, both individually and on the organization.

Key words: health information systems, supply chain management, medicine

INTRODUCTION

Information technology has a positive impact on healthcare¹. Health information technology (HIT) can potentially improve healthcare quality and outcomes by innovating healthcare delivery processes, including (a) providing clinicians with timely and appropriate patient information; (b) enhancing care coordination; (c) increasing physician compliance with care guidelines; (d) facilitating clinical monitoring by means of large-scale screening and aggregation of data; (e) improving clinical workflows; (f) improving communication among clinicians, and between clinicians and patients; and (g) decreasing medication.

One of the uses of HIT in the health sector is on supply chain management (SCM) for drug and medical supplies². SCM can be defined as a system of suppliers, manufacturers, distributors, retailers, and customers, in which material typically flows downstream from suppliers to customers (except for reverse logistics), while information flows in both directions. SCM can improve efficiency and effectiveness in terms of planning, coordinating, and controlling the movement of materials³. In Indonesia, medicines and medical supplies are assigned particular importance in health sector management because, as valued assets with a monetary dimension, drugs and medical devices are audited periodically.

Effective and transparent tracking systems allow pharmacies to accurately record inventory components, such as medication expiration dates and physical quantities⁴. Accordingly, there has been significant research emphasis on the role of information sharing and information integration as a way of achieving better supply chain performance⁵.
Drugs and medical supplies are an important component of modern healthcare systems, reducing the burden of diseases across the globe. The application of SCM practices in the healthcare sector relates not only to physical goods, like drugs, pharmaceuticals, medical devices, and health aids, but also to the flow of patients. In managing medicines and medical supplies, one of the key objectives is to ensure the availability and quality of drugs at every level, both in healthcare institutions and in pharmaceutical installations in regions, provinces, and centrally. In accordance with the Indonesia Presidential Regulation concerning National Health Systems, SCM must be properly designed to maintain an adequate supply of drugs; maintain the availability of drugs according to buffer stock; maintain drugs in good condition during the distribution process to ensure their quality, safety, and efficacy; minimize drug wastage due to damage or expiration; ensure the accuracy of documents and logistics information systems; provide information for estimating drug needs; and ensure that each district’s drug needs are met through appropriate planning.

One entity that plays an important role in Indonesia’s national health system is the Puskesmas, or primary health center (PHC), which is responsible for local delivery of public health services. In carrying out its functions, which include prevention, promotion, and basic treatment, the PHCs depend on the supply of medicines and medical supplies to ensure delivery of health services to the community. PHCs receive drugs and medical supplies from the pharmaceutical installation at the district or city level; to maintain accountability, each PHC must send monthly reports on stock and usage of these items to the pharmaceutical installation at the district health office (DHO). These reports are then used as the basis for supplies allocation for the following month.

One common difficulty in SCM is controlling the movement of drugs and medical supplies at the healthcare facility level; the inefficient and irrational use of medicines has also become a problem at all levels of the health service. In the city of Depok, the health office has complained about the difficulty of promptly obtaining accurate information about stock, expenditure, and usage of drugs and other medical supplies, which has adversely impacted planning, budgeting, procurement, and distribution.

In 2014, in collaboration with the Faculty of Public Health at Universitas Indonesia, the Depok Health Office developed an information system called Sistem Informasi Pengelolaan Obat (Drugs and Medical Supplies Management Information System; SIPO) for managing medicines and medical supplies. Depok City’s PHCs and DHO had previously used a paper-based system to record and report drug and medical supplies, which was tabulated on spreadsheets and saved as separate files. SIPO is an internet-based system that connects PHCs with the DHO. The system was developed to assist distribution of drugs and medical supplies and to automate report preparation, meaning that PHCs and health offices are no longer charged with manual reporting to the DHO. In this study, we evaluate and assess the utilization of SIPO in terms of its success as an information system.

**METHOD**

This is a descriptive study, which employs qualitative methods to assess the success of SIPO. We apply DeLone and McLean’s model for measuring the success of an information system, using six aspects, each of which has its own variables. These are system quality (flexibility, integration, response time, error recovery, system convenience, and language), information quality (completeness, precision, reliability, currency, and output format), service quality (assurance, empathy, and responsiveness), user satisfaction (repeat purchases and repeat visits), individual benefit (usefulness, ease of use, speed of use, productivity, and effectiveness), and organizational benefit (organizational effectiveness, service effectiveness, contributing to achieving goals, and productivity).

There are seven informants involved in this assessment, six users from the PHCs and one from the DHO. The informants were selected purposefully for their familiarity with the system. Informants were asked to give a mark or score using ten point scale to measure users satisfaction for each variable. Zero (0) is represent for very dissatisfied, five is represent for neutral, and ten (10) is represent for very satisfied. In this study, we only conducted a descriptive analysis to know how much user satisfaction regarding to the SIPO.

**RESULTS AND DISCUSSION**

The SIPO system was developed to aid monitoring and management of drugs across health centers
and pharmaceutical installations, and to facilitate communication relating to drug management. At the DHO level, SIPO is used for recording receipts, distribution, and monitoring of stock at health centers and in warehouses (pharmaceutical installations), and for making required reports. At PHC level, SIPO is also used to record recipe-based drug expenditures. All required reports are created automatically.

### Table 1. Score Results

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Scores (n=7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>System quality</td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>7.9</td>
</tr>
<tr>
<td>Response time</td>
<td>6.8</td>
</tr>
<tr>
<td>Integration</td>
<td>0.0</td>
</tr>
<tr>
<td>Error recovery</td>
<td>7.8</td>
</tr>
<tr>
<td>System convenience</td>
<td>8.0</td>
</tr>
<tr>
<td>Language</td>
<td>8.3</td>
</tr>
<tr>
<td>Average</td>
<td>6.5</td>
</tr>
<tr>
<td>Information quality</td>
<td></td>
</tr>
<tr>
<td>Completeness</td>
<td>7.3</td>
</tr>
<tr>
<td>Precision</td>
<td>7.9</td>
</tr>
<tr>
<td>Reliability</td>
<td>8.0</td>
</tr>
<tr>
<td>Currency</td>
<td>7.9</td>
</tr>
<tr>
<td>Output format</td>
<td>8.8</td>
</tr>
<tr>
<td>Average</td>
<td>8.0</td>
</tr>
<tr>
<td>Service quality</td>
<td></td>
</tr>
<tr>
<td>Assurance</td>
<td>8.3</td>
</tr>
<tr>
<td>Empathy</td>
<td>7.4</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>8.1</td>
</tr>
<tr>
<td>Average</td>
<td>7.9</td>
</tr>
<tr>
<td>User satisfaction</td>
<td></td>
</tr>
<tr>
<td>Repeat purchases</td>
<td>8.0</td>
</tr>
<tr>
<td>Repeat visits</td>
<td>8.0</td>
</tr>
<tr>
<td>Average</td>
<td>8.0</td>
</tr>
<tr>
<td>Individual benefit</td>
<td></td>
</tr>
<tr>
<td>Usefulness</td>
<td>8.3</td>
</tr>
<tr>
<td>Ease of use</td>
<td>8.5</td>
</tr>
<tr>
<td>Speed of use</td>
<td>8.4</td>
</tr>
<tr>
<td>Productivity</td>
<td>7.9</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>8.5</td>
</tr>
<tr>
<td>Average</td>
<td>8.3</td>
</tr>
<tr>
<td>Organizational benefit</td>
<td></td>
</tr>
<tr>
<td>Organizational effectiveness</td>
<td>8.5</td>
</tr>
<tr>
<td>Service effectiveness</td>
<td>8.8</td>
</tr>
<tr>
<td>Contributing to goals</td>
<td>8.5</td>
</tr>
<tr>
<td>Productivity</td>
<td>8.5</td>
</tr>
<tr>
<td>Average</td>
<td>8.5</td>
</tr>
<tr>
<td>Overall average</td>
<td>7.9</td>
</tr>
</tbody>
</table>

Based on these results, users feel that the quality of the SIPO system is slightly satisfy (average 6.5), except for integration. The integration indicator has the lowest score because SIPO cannot yet connect to other systems to facilitate the users’ work.

On information quality, the lowest score from users is for completeness (average 8.0) SIPO does not yet facilitate the input of all information regarding drugs that expire, which is very important because drugs that expire earlier must be issued before drugs that expire later (first expired, first out) and drugs that arrive first must be removed before drugs that arrive later (first in, first out). In other words, there are several indicators that need to be added to SIPO, both for input and output.

In terms of user satisfaction, informant stated that they are satisfied with SIPO (average 8.0). Users say that they will continue to use SIPO even if it is not required, because the data and information produced helps simplify work, especially in terms of reporting.

For individual benefits, the informants consider that SIPO has a significant individual impact and supports their daily work, including improving productivity, and particularly report generation. Overall, informants at both the PHC and DHO feel that SIPO has a positive effect on their organizations, particularly on drug and medical supplies management. The DHO can control every transaction at every PHC, with manual reporting no longer required.

SIPO was developed as an electronic recording and reporting system to replace the previous paper-based approach. As changing methods to improve a system always present major challenges, it is important to assess the level of user acceptance. An information system must be useful if it is to improve performance. To ensure that drugs and medical supplies are made available in a timely way at health facilities, a functioning country-wide drug supply system should be in place. Each player in the system should also be responsible and accountable for the system’s operation. SCM integrates all aspects of the supply chain from first supplier to end user. The main objectives of SCM are (a) overall cost reduction, (b) lead-time reduction, (c) inventory and shortfall reduction, (d) transportation cost reduction, and (e) purchase cost reduction.

Effective management and distribution of drugs
helps to ensure availability and assessment of future need\textsuperscript{4}. There is extensive evidence that the use of information technology to manage work provides many advantages, including cost effectiveness, efficiency, and quality of care\textsuperscript{13}. To achieve improved performance, the healthcare supply chain must be efficient and integrated\textsuperscript{3}. To meet these needs, SIPO integrates the recording and reporting of drug and medical supplies at PHC and DHO levels by incorporating information technology into the business process. Both directly and indirectly, SIPO has changed the flow of the business process and bureaucratic management of drugs and medical supplies in the city of Depok.

To ensure a system’s sustainability, several factors must be considered, including user motivation, leadership, and user satisfaction. Having the right user attitude and skills base—together with good leadership, an IT-friendly environment, and good communication—can have a positive influence on system adoption\textsuperscript{14}. The Depok City Health Office stipulates that each health center must use SIPO to record and report its drugs or be denied access to drug distribution. This is an important motivator for the use of SIPO in health centers.

Leaders play an important role in information technology implementation\textsuperscript{15}. The implementation of SIPO was strongly encouraged by leaders at both PHC and DHO levels. One important role of leadership in this context was the approval function built into the system; at the DHO, the head of the pharmaceutical installation must give online approval for any item to be distributed to health centers, and the item can only be processed if it has been approved. To address the problem of bureaucracy, the process can continue even when the leader is not present in the office, the leader still can approve through their smartphone. Approval function also can be giving to another person who responsible to this. Similarly, the head of each PHC plays a leadership role in system sustainability by means of a monthly approval action, and monthly reports are then sent automatically to the DHO.

The role of leadership in driving HIT use and innovation is informed by the technology-enabled environment principle\textsuperscript{16}. User satisfaction is influenced by several factors, including perceived usefulness, ease of use, user expectations, user experience, user skills, user involvement in system development, organizational support, perceived attitude of top management, and user attitude to information systems\textsuperscript{17}.

Our observations indicate that SIPO can improve users’ performance in drug recording and reporting. Using SIPO, reports are automatically produced each month, meaning that users no longer need to print and send hard copies to the DHO. Users at the DHO receive information directly about the number and types of drugs needed by each PHC in Depok City, making the process of distributing drugs faster and timelier. Other studies have identified a close relationship between SCM practices and organizational improvement\textsuperscript{18,19}. Successful use of HIT can assist such organizations in leveraging resources\textsuperscript{20}.

CONCLUSIONS

Success of a system can be assessed in six main aspects: system quality, information quality, service quality, user satisfaction, impact on individuals, and impact on the organization. Generally, SIPO is considered to have had a positive impact, both individually and on the organization.

Although the SIPO system can be said to be a success, the issue of system integration remains a problem, because SIPO is still a stand-alone system. From the viewpoint of the quality of information produced by SIPO, the completeness of the indicators is also a goal for future system improvements, because there are several reports that have not yet been implemented in SIPO. Another required improvement is in the input systems.

Users report satisfaction with SIPO at both the PHC and DHO levels; they feel helped by SIPO and do not feel forced to use it, even though it is actually mandatory. Users at the PHC and DHO also assess SIPO as having a positive individual impact; however, productivity is scored lower because, even if users feel more productive using SIPO, further improvements are needed to be able to monitor drug and medical supplies.

Users at the PHC and DHO also assess SIPO as having a positive organizational impact. Drug management at the PHC and DHO has become more effective and efficient and contributes to achieving organizational goals in terms of drug supervision and monitoring.

Conflict of Interest Statement: The authors of this research declare that there are no conflicts of interest
related to this study.

Ethical Clearance: Ethical clearance for this research was received from the Ethics Committee of the Faculty of Public Health, Universitas Indonesia.

Source of Funding: This is a self-funded study.

REFERENCES
18. Harrison JP, McDowell GM. The role of laboratory information systems in healthcare quality improvement. Int J Health Care Qual

Analysis of Risk Factors for Changing Conversion of Pulmonary Tuberculosis AFB Positive Patients in the Intensive Phase, Makassar City, Indonesia

Ummi Kalsum Supardi¹, Mondastri Korib Sudaryo², Ida Leida. M. Thaha²

¹Master of Epidemiology, ²Departement of Epidemiology, School of Public Health, University of Indonesia

ABSTRACT

Objective. The association of risk factors of tuberculosis has been known but still rarely performed risk factors to result of conversion among patient tuberculosis in 2 month treatment of DOTS. The study aims to know the risk factors of conversion against pulmonary tuberculosis BTA positive in Makassar.

Method. This was a case control study. Subjects of this study were pulmonary tuberculosis AFB positive patients in 2 month treatment of DOTS (intensive phase) in Labuang Baji hospital and Lung Health Center, 111 patients from December 2013 until February 2014. Cases were positive smear pulmonary tuberculosis patient who experiences no conversion at the end of the intensive phase of treatment and control were patients with positive smear pulmonary tuberculosis who did not experience conversion at the end of the intensive phase.

Result. The proportion of pulmonary tuberculosis AFB positive patients were conversion 33,3% and no conversion 66,7%. Chi square test showed statistically significant association against conversion (p<0,05) were education.

Conclusion. Education was important factor for changing conversion of pulmonary tuberculosis AFB patients. Health promotion program about tuberculosis should be the best solution to improve the proportion conversion among patients.

Keywords: Risk Factors, Conversion, pulmonary tuberculosis AFB Positive patients.

INTRODUCTION

Tuberculosis is still a public health problem that is a global challenge. Tuberculosis is a direct infectious disease caused by Mycobacterium tuberculosis and can be transmitted by air. Mycobacterium tuberculosis when, sneezing, talking or laughing. it attacks the lungs, but can also attack other organs. This causes health problems in millions of people every year and the second rank as a cause of death in infectious diseases worldwide after HIV.¹

WHO has global target in the context of eradicating pulmonary tuberculosis in 2030. It is monitoring the progress of the pulmonary tuberculosis eradication program to ensure failure of treatment for pulmonary tuberculosis up to 85%. Based on 2009 data. Globally, the incidence of pulmonary tuberculosis reached 137 cases per 100,000 population. While the highest percentage of achievement of treatment success occurred in 2008 at 86%. And in 2013 the success rate of TB treatment increased to 90.5%. In this case, even though the National tuberculosis control program has succeeded in achieving global targets but in 2013, Indonesia will still got the fifth rank in the country with the highest tuberculosis burden in the world, an estimated number of new cases of 410,000-520,000 tuberculosis prevalence rates of 272 per 100,000 residents while the estimated incidence is 183 per 100,000 population.²
A study conducted by Tierney DB, On MDR TB patients who started treatment between 1999-2002 were 87.7% experienced sputum conversion with a median conversion time of 59 days (IQR:31-92). Normally, tuberculosis patient would experience conversion after 2 month treatment (intensive phase) except for patients were not regularly to do treatment DOTS\textsuperscript{10}.

Based on the target proportion of conversions in the South Sulawesi was 85% while in the main health care services proportion of conversion were low. Labuang Baji hospital and Lung Health Center in Makassar had proportion of conversion were 12% and 15% in 2013. Due to the above data, it can be seen that the level of achievement of targets at both health services very low. So, it was needed a study to determine the risk factors for changing conversion of pulmonary tuberculosis patients.

**METHOD**

**Study Sample**

Ethical Consideration

Written informed consent was obtained from all respondents before data collection was carried out.

**Study Design**

This study uses a case control design. Data collection was conducted in December 2013 to February 2014.

**Population and Sampel**

The study population was new positive smear pulmonary tuberculosis patients who underwent an intensive treatment period in the DOTS strategy, Makassar city, Indonesia. Samples were a part of the population who had completed intensive phase treatment at Labuang Baji General Hospital and Community Lung Health Center, there were 111 patients. Cases were positive smear pulmonary tuberculosis patient who experiences no conversion at the end of the intensive phase of treatment and control were patients with positive smear pulmonary tuberculosis who did not experience conversion at the end of the intensive phase. The sampling technique used exhaustive sampling techniques to select cases while controls were selected by accidental sampling technique\textsuperscript{3}.

**Socio-Demographic Characteristics and Risk Factors**

We include demographic information and individual characteristics (age, gender, education, occupation, socio-economic, tuberculosis, knowledge measured using the guttman scale), DM, regular treatment DOTS, role of PMO, and side effects of tuberculosis drugs as risk factors analyzed in this study.

**Measures**

**Measurement of Sputum Conversion**

Measurement of sputum conversion was seen based on AFB microscopic examination in positive smear pulmonary TB patients at the end of the 2-month intensive phase of treatment.

**Tuberculosis Measurement**

The diagnosis of tuberculosis was based on the results of microscopic smear positive smear in patients before receiving intensive phase treatment for 2 months.

**Statistical Analysis**

Analysis was carried out after getting information about risk factors using a questionnaire that had been tested for validity and reliability. Data processing was done electrically using computerized SPSS 20 for Windows programs. Data analysis was done by univariate by looking at the description of the frequency distribution of each independent variable, bivariate by Chi-square test to determine the relationship of the frequency of the dependent variable with the independent variable to see the risk factors against the results of conversion in patients pulmonary tuberculosis AFB positive.

**RESULTS**

Analysis and description of each study variable as a risk factor against result conversion of 111 patients, the proportion of conversion (33,3%) and no conversion (66,7%).
### Table 1. Analysis of Risk Factors for Changing Conversion of Pulmonary Tuberculosis AFB Positive Patients in The Intensive Phase.

<table>
<thead>
<tr>
<th>Variable (Factor Internal)</th>
<th>Converting Case</th>
<th>Non Converting Control</th>
<th>Total</th>
<th>OR</th>
<th>95% CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;48</td>
<td>26</td>
<td>55</td>
<td>81</td>
<td>0.817</td>
<td>0.340-1.963</td>
<td>0.650</td>
</tr>
<tr>
<td>≥48</td>
<td>11</td>
<td>19</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>29</td>
<td>55</td>
<td>84</td>
<td>1.252</td>
<td>0.489-3.208</td>
<td>0.639</td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
<td>19</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>13</td>
<td>37</td>
<td>61</td>
<td>0.542</td>
<td>0.240-1.223</td>
<td>0.138</td>
</tr>
<tr>
<td>High</td>
<td>24</td>
<td>37</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>16</td>
<td>32</td>
<td>58</td>
<td>1.723</td>
<td>0.777-3.821</td>
<td>0.179</td>
</tr>
<tr>
<td>High</td>
<td>21</td>
<td>42</td>
<td>53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work</td>
<td>28</td>
<td>43</td>
<td>71</td>
<td>0.446</td>
<td>0.185-1.077</td>
<td>0.069</td>
</tr>
<tr>
<td>No Work</td>
<td>9</td>
<td>31</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 2. Analysis of Risk Factors for Changing Conversion of Pulmonary Tuberculosis AFB Positive Patients in The Intensive Phase.

<table>
<thead>
<tr>
<th>Variable (Factor Eksternal)</th>
<th>Converting Case</th>
<th>Non Converting Control</th>
<th>Total</th>
<th>OR</th>
<th>95% CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Economy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>23</td>
<td>51</td>
<td>74</td>
<td>1.350</td>
<td>0.590-3.086</td>
<td>0.477</td>
</tr>
<tr>
<td>High</td>
<td>14</td>
<td>23</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes Melitus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0.155</td>
<td>0.016-1.548</td>
<td>0.072</td>
</tr>
<tr>
<td>No</td>
<td>34</td>
<td>73</td>
<td>107</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular Treatment DOTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>21</td>
<td>38</td>
<td>59</td>
<td>1.243</td>
<td>0.562-2.751</td>
<td>0.591</td>
</tr>
<tr>
<td>High</td>
<td>16</td>
<td>36</td>
<td>52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role DOTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>21</td>
<td>48</td>
<td>69</td>
<td>0.711</td>
<td>0.317-1.593</td>
<td>0.406</td>
</tr>
<tr>
<td>High</td>
<td>16</td>
<td>36</td>
<td>52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role of Health Worker</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Based on risk factor variables, the largest proportion were in no control group (table 1 and table 2). It can also be seen that the highest risk factor internal was of gender (OR=1.252), knowledge (OR=1.723) and the highest risk factor eksternal was of social economy (OR=1.350), regular treatment DOTS (OR=1.243), effect of drugs (OR=1.568).

**DISCUSSION**

Based on the results of the analysis, it is known that gender, Knowledge, sosial economy, regular treatment DOTS and effect of drugs, are risk factors for conversion among smear pulmonary tuberculosis patients in Makassar. Cases of smear-positive TB, especially men and those with risk factors identified for non-conversion, must be monitored closely during their treatment period. In patient compliance counseling and education to reduce TB non-conversion risk factors, and to increase TB conversion and cure rates.

In a study, which stated that TB knowledge was poor among respondents and many misconceptions about TB stated that the lack of education and distance from home to health center were significantly related to the delay in seeking care from the service provider. This was further demonstrated by a prospective cohort study conducted in South Africa, which found that illiterate patients were more likely to interfere with treatment. Patients in this study demonstrated a good understanding of transmission and risk factors for TB. However, some patients are not aware the causes of TB and the transmission. Health education efforts must take advantage of these positive findings of learning. Explained the knowledge of patients who are very low can determine the patient’s disobedience to take medication because of the lack of information provided by health workers about pulmonary tuberculosis disease, treatment and its prevention. Knowledge of patients about TB does not directly affect the increase in knowledge TB sufferers. The most powerful aspects of knowledge are treatment methods and side effects.

The results of this study are in not accordance with the research conducted by Maulidya states there is no relationship between knowledge and compliance with treatment for TB patients. This means, the higher or the lower of patient’s knowledge does not affect his recovery. TB knowledge is low and many misconceptions about TB these should be targeted through health education programs. Both TB knowledge gaps could be better addressed through an integrated health education program. These findings highlight the need for health education efforts to strengthen accurate information dissemination to promote sound TB knowledge and attitudes among patients. Lower education was an important factor in TB.

In a study, which stated that TB knowledge was poor among respondents and many misconceptions about TB stated that the lack of education and distance from home to health center were significantly related to the delay in seeking care from the service provider. This was further demonstrated by a prospective cohort study conducted in South Africa, which found that illiterate patients were more likely to interfere with treatment. Patients in this study demonstrated a good understanding of transmission and risk factors for TB. However, some patients are not aware the causes of TB and the transmission. Health education efforts must take advantage of these positive findings of learning. Explained the knowledge of patients who are very low can determine the patient’s disobedience to take medication because of the lack of information provided by health workers about pulmonary tuberculosis disease, treatment and its prevention. Knowledge of patients about TB does not directly affect the increase in knowledge TB sufferers. The most powerful aspects of knowledge are treatment methods and side effects.

The results of this study are in not accordance with the research conducted by Maulidya states there is no relationship between knowledge and compliance with treatment for TB patients. This means, the higher or the lower of patient’s knowledge does not affect his recovery. TB knowledge is low and many misconceptions about TB these should be targeted through health education programs. Both TB knowledge gaps could be better addressed through an integrated health education program. These findings highlight the need for health education efforts to strengthen accurate information dissemination to promote sound TB knowledge and attitudes among patients. Lower education was an important factor in TB.

While social support for TB patients reduced default. Further prospective randomised studies are necessary to evaluate the impact and to determine the most cost-effective social support for improving treatment outcomes of TB in patients, especially among populations at risk of default. Interventions to reduce default should therefore concentrate on socially disadvantaged patients. Our findings measure the risks associated with a variety of social factors and tuberculosis. Poverty, diabetes were independently associated with an increased risk of tuberculosis.

The consistent study in evaluating and comparing time and predictors of culture conversion, in Latvia got results a median sputum conversion rate of 60 days (range 4-462 days) of 77% of patients who experienced sputum conversion. Shortening treatment from 6 to 4 months in adults with noncavitary disease and culture conversion after 2 months using current drugs resulted in a greater relapse rate. The combination of noncavitary disease and 2-month culture conversion was insufficient to identify patients with decreased
risk for relapse. TB patients remained smear-positive after 2 months of treatment. Patients with cavitation, higher smear grading and those who had not used DOTS continuously in the initial treatment phase had a longer time to sputum smear conversion.

The recommended tuberculosis treatment is at least 6 months. It must be completed but if the patient feels healed, patients stopped the treatment. This is due to the lack of knowledge of the importance of treatment. Therefore, there should be counseling about the importance of TB treatment and the consequences of incomplete treatment. Relationship between age and type of treatment is found in 36 people (100%) productive age respondents get OAT category 1. Based on the results of statistical tests, p value is 0.023 where $\rho <0.05$ so it can be concluded that there is a significant relationship between age and type of treatment. It is possible that immunological systems at unproductive age (>50 years) are very susceptible to various diseases, including pulmonary tuberculosis. The older the age will be a functional change in physiological, pathological and decreased body defense systems. It will affect the body's ability of tuberculosis treatment.

Duration of Tuberculosis treatment more than 2 months can result dropping out. After the intensive treatment, Patients must take antibiotics for at least six months to nine months. Uncomplete treatment will cause drug resistance. Therefore, it is needed to educate TB patients about the importance of completing each stage of TB treatment, so that patients can complete the treatment.

In 1107 eligible patients, the treatment success rate was 81.5% and the default rate 9.4% (respectively 60.4% and 17.0%). The main risk factors for treatment default can be influenced. Interventions to reduce default should therefore concentrate on socially disadvantaged patients. 2–3 drugs, HR 7.2, 95%CI 3.3–16.0, $P<0.001$ was significantly associated with an increased risk of default for MDR-TB treatment.

**LIMITATION**

The results obtained in this study may still be influenced by selection bias when choosing controls from accident sampling. The use of the control case design has a weakness because it has valid controls to compare with the case and the sample in this study is unadequat while this study has several variables, it makes the actual risk factors in the theory do not match with the results of this study.

**Acknowledgement:** We thankful to the Research and Development Center of University of Indonesia for the financial support. The preparation of this manuscript was support by University of Indonesia. We are grateful to TB Paru patients BTA positif as study participants.

**Conflict of Interest:** Both author declared that no competing interest exist.

**Source of Funding:** This study was supported by a 2018 PITTA Grant from the Research and Community Development Center of University of Indonesia.

**REFERENCES**

8. Kigozi, N. G. et al. (2017) ‘Tuberculosis knowledge, attitudes and practices of patients at primary health care facilities in a South African metropolitan:
Research towards improved health education’, 


Therapy Role of Camel Milk for the Treatment of Hepatitis Mice Which Induces via *Listeria Monocytogenes*

Shureen Hussein Ameen¹, Azeez Khalid Hameed²

¹Assistant Lecturer Chamchamal Technical Institute, Sulaimania Polytechnic University, Sulaimania, Iraq,
²Professor College of Science, University of Tikrit, Tikrit, Iraq

**ABSTRACT**

The goal of the current study was to administer the role of camel milk on hepatic histopathological induced via experimental infection with *L. monocytogenes* in Swiss albino mice. The mice were divided into four groups (A, B, C and D). The control group received water and fed *ad libitum*. The other groups received orally *L. monocytogenes*, Group B sacrificed after fourteenth day. Group C received 1ml of camel milk, Group D received *ad libitum* of camel milk. Mice of both groups sacrificed after two weeks. Livers of all mice groups were taken to histological study. Histological sections of the liver of group B detected more sever changes including the acquisition of granular appearance for most tissue of liver lobes, hepatic cells necrosis with multiply micro abscesses compared with control groups. While liver of groups C and D showed normal structure of liver in most sections were represented via reduce the acquisition of granular appearance and increases number of Kupffer cells and in liver of group C while in group D showed several Hepatic cells to be ready for division, hyperplasia and hypertrophy of kupffer cells.

**Keywords**: Therapy Role, Camel milk, hepatitis, *L. monocytogenes*, Adult mice

**INTRODUCTION**

Each year in developed countries, food-borne pathogens are responsible for causing millions of gastrointestinal disorders [1]. *L. monocytogenes* is an important food–borne opportunistic human and animal pathogen [2]. It was responsible for numerous food-borne outbreaks with high hospitalization and mortality average worldwide, specially affecting patient immune compromised adult, elderly and pregnant women [3]. These due to the *L. monocytogenes* is widely spread in nature and it has been isolated from diverse of environmental source [4] like soil, plants, water, food chain, food processing [3] dairy product, raw milk, fruit and vegetables [5]. As found on nonfood contact surface [6]. This wide spread of bacteria is due to resistant to hard environmental conditions, including psychotropic, high NaCl concentration and low pH. In numerous ways, *L. monocytogenes* can enter into food, processing plants, its ability to survive for long period in the environment, on food processing plants and its ability to grow at very low temperature (2°C - 4°C), also to survive in or on food for prolonged period under bad conditions [7, 8].

In many parts of the world, Camel milk considered as one of the key ingredients of several traditional medicines as well as for human diet. It has a high bioactive value as result of higher composed of antimicrobial factors like Immunoglobulins, Lactoferrin and Lysozyme [9]. Recent studies confirmed that the composition of camel milk is unique in terms of anti-oxidative factors, antibacterial, antiviral, antifungal, antitumor activity, hypoglycemic and anti-cancer, to prevent aging for autoimmune diseases effect [10, 11].

The present research was proposed with an objective to study pathogenicity of *L. monocytogenes* in adult mice and role of camel milk to reduce pathological changes which are induced by this bacteria.

**MATERIAL AND METHOD**

**Bacteria strain**

The standard culture of *L. monocytogenes* (ATTC 83) was obtained from Medya Diagnostic center/ Erbil city/ Iraq. It was assessed for Its purity carried out some recommended biochemical tests to ensure that the diagnosis was correct.
**Camel milk source**

The milk sample was collected from Hawija which is 45 Km far from Kirkuk city/ Iraq. Camel was in the first month of lactation period fed mainly on pasture, which grows in the natural grassland in addition to the dates, bran and water. Milk Sample was obtained by a manual way milking (Hand milking). Milk was transported to the laboratory in cooled conditions, then keeping it in the refrigerator under temperature (4-2) º C until use.

**Pathogenicity of bacteria and preparation of inoculums**

*L. monocytogenes* were grown overnight in Brain Heart infusion liquid medium plus 6% glucose and yeast extra in an incubator at 37Cº. Bacterial cells were harvested by centrifugation 3000 rpm for 10 minutes, washed three times in phosphate-buffered saline. The bacterial suspensions were diluted to achieve the final suspension $4.5 \times 10^6$ CFU/ml and numbers of viable *L. monocytogenes* was done according to [12].

**Animals used in the experiment**

A total of 40 Swiss albino mice 27±2 in weigh, aged 4-6 weeks were used in this study. They were purchased from college of Veterinary Medicine/ University of Tikrit/ Iraq. Mice were kept in the animal house in wire-meshed stainless steel cages (five/ cags). The environment in the animal house was controlled in which the temperature was maintained at (20 - 24C°) with 12 h light/ dark cycle with good ventilation. They were fed by commercial pellet diet. The animals were kept in this environment for 7 days before starting the experiment for acclimatization.

**Experimental Groups and Histology:**

Mice divided randomly into four groups comprising 10 mice in each group and fed the same diet throughout the experimental period. Group A: given water and fed *ad libitum*. Group B: given dose of bacteria suspension $4.5 \times 10^6$ CFU orally one time for one a day. Group C: given 1ml of Camel milk orally two times a day. Group D: given *ad libitum* of Camel milk .

All animals in group A and B were scarificed and dissected after 14 days. As for the rest of group C and D the same procedure was used for bringing about a bacterial infection. Then animals were left for 14 days and treatment will be started in the morning of fourteenth days by camel milk for the groups B and C. finally scarificed the animals of two groups after two weeks of the treatment. Liver of all groups were fixed in 10% neutral bufer formalin. After 48 hours, livers were trimmed and processed routinely in paraffin, sectioned at 5µm , and stained with hematoxylin and Eosin stain [13]

**RESULT & DISCUSSION**

Histological examination of liver controlling mice group (group A) showed that hepatic cell, portal area and vasculature appear normal. The livers of group mice B showed hepatitis which acquisition of granular appearance for most tissue of liver lobes (Fig 1) as compared to the normal architecture of hepatic cells. In other sections observed focal necrosis, vacuolated and karyolysis most of hepatic cell’s nucleus also infiltration of inflammatory cells in central vein and hyperplasia of their endothelium (Fig 2). Additionally, results showed multiple micro abscesses sprinkled in parenchyma in liver sections for all mice of group B characterized by necrosis of hepatic cells, dense infiltration of lymphocytes and few neutrophils (Fig 3). Also, there was macrophages in some sections (Fig 4). The granular appearance of liver tissue attributed to infiltration of inflammatory cells among hepatic cells where [14] mentioned that *L. monocytogenes* have a cell wall component that is mitogenic for lymphocytes and lipid components, which stimulates the monocytosis for which it is named. On the other hand, these bacteria have listeriolsin O which have highly lytic role for nucleated cells and it can be prompting abroad range of various cells death kinds. Perhaps this explains the presence of nuclei at different stages of lysis [15]. Additionally, *L. monocytogenes* carried via blood to liver after crossing the intestinal barrier, this is the majority of the invading bacteria is trapped in the liver [16]. Infected hepatic cells react to *listeria* infection via liberation neutrophil chemoattractions and display boost in adhesion to neutrophils, leading to micro abscess [17]. Monocytes are other early responding cell type that infiltrates infectious foci within 24 -48 hours and this occurs following both oral and iv infection [18].

While the microscope examination of mice group C showed normal structure of liver in most sections with reducing granular appearance and demonstrated normal central vein. Also, normal arrangement of hepatocytes and sinusoids Liver with few numbers of inflammatory cells around central vein in some sections [9].
In parenchyma, hyperplasia of Kupffer cells was noticed in some section of this group (6) in other hand there was showed absent of the inflammatory cells inside central and portal vein, and normal endothelial lining them. While the histological architecture of the liver of mice group D was similar to mice group A. Absent granular appearance, micro abscesses (7). Several hepatic cells also were showed to be ready for division, hyperplasia and hypertrophy of Kupffer cells (8).

Many studies in vivo and vitro have proofed a significant backing for proving camel milk protective effects on liver destruction. It acts as antibacterial, antiviral, anti-fungal and anti-parasitic activity [19, 20] because it has antibacterial enzyme like Lactoferrin, lysozyme, immunoglobulins, N-acetyl-S–glucosaminidase, protective protein like casein, stronger immune system and smaller immunoglobulins than other ruminates [21]. The reduction of granular appearance of liver tissue of mice group C and its absent in mice group D may be due to the role of anti-inflammatory ingredients of camel milk it is Lactoferrin which has been distinguished avoid TNF-α, IL-1 and IL-6 in mononuclear cell in vitro and vivo response to LPS stimulation [22]. The anti-inflammatory role of Lactoferrin can be attributed as it has positive charge in its surface, which interacts with negatively charged moieties like proteoglycan on the surface of immune cells.
This combination can trigger signaling pathways that produce physiological anti-inflammatory. Not only have these actions also Lactoferrin acts as antibacterial which prevents the reach of iron at the site of infection which is nutrient for the bacteria. In this case it plays bacteriostatic effect. Lack of iron in the environment obliges bacteria to move because it cannot adhere to the host surfaces. Additionally reported that Lactoferrin blocks pathogens adhesion to target cells. This characteristic was suggested for the first time against enteroinvasive Escherichia coli (HB. 101) and later against Staphylococcus aureus, Yersinia enterocolitica, Shigella dysenteriae, L. monocytogenes, Helicobacter pylori, Neisseria gonorrhoeae, Pemphigus neonatorum, Bordetella pertussis, Streptococcus pyogenes and Y. pseudotuberculosis. The repair of liver to normal architecture can be attributed to the role of synergizing of Lactoferrin and lysozyme. Where they mentioned that the gram positive bacteria have anionic molecules like lipoteichoic acid of the surface, Lactoferrin which binds with this molecules and this electrostatic binding decreases the overall negative charge of cell wall making easy effectiveness of antibacterial ingredients like lysozyme and antibiotics. This improvement due to the effective effect of the ingredient of this milk and its unique medicinal properties in terms of its high concentration of vitamins and protective proteins and immunological. This feature made it distinctive different from other animals in terms of containing high concentration of antioxidants of vitamins A, B2, C and E. These anti-oxidant vitamins play an important role in preventing tissue damages by removing free radicals. It also works to protect the cells from the effect on internal toxins, which act on the oxidation process that is accompanied different tissue changes. Also, it contains high concentration of Magnesium, Potassium, Sodium, Copper and Zinc. While, suggested that the Zinc in camel milk plays an important role in stimulating hepatic cell to mitotic division and differentiation the cells of the immune system. It may elaborate the increase of numbers of Kupffer and increase the volume of hepatic cells prepared for division.

Figure 5. Showed normal structure of liver, normal central vein, normal arrangement of hepatocytes, few number of inflammatory cells around central vein (H&E) X400

Figure 6. Liver section showing few number of inflammatory cells, hyperplasia of Kupffer cells (H&E) X400

Figure 7. Showed normal hepatic cells arrangement around central vein and lining with normal endothelium, sinusoids (H&E) X400

Figure 8. Showed several hepatic cells to be ready for division hypertrophy of Kupffer cells
Conflict of Interest: Nile

Source of Funding: Self-Funded

The Ethical Committee of the concerned institute approved the research protocol. The purpose and procedures of the study were to be explained to all the study subjects, and informed consent was to be obtained from them.

REFERENCES


32. Yousef MI. Aluminum induced changes in hematobiochemical parameters, lipid per oxidation and enzyme activities of male rabbits: protective role of ascorbic acid. Toxicology. 2004; 215: 97-107.


Physical Activity: Mine Workers’ Behavior Related With Metabolic Syndrome

Dwi Okta Rizkiani¹, Robiana Modjo¹

¹Occupational Health and Safety Department, Faculty of Public Health, Universitas Indonesia, Kampus UI, Depok, 16424, Indonesia

ABSTRACT

Metabolic syndrome is a term for risk factors for heart disease and diabetes mellitus. Workers have different lifestyle behaviors and work patterns that can cause metabolic syndrome. Based on medical check-up data in 2016, there were found several cases of dyslipidemia (97.5%), visual impairment (47.8%), BMI> 25 (45.2%), abnormal audiometry (17%), liver enzyme disorder (1.7%), and hypertension (10 %). Among those cases, there are 3 problems which are identified as the components of the metabolic syndrome. This study was conducted to explain the factors related to metabolic syndrome in mine workers to make control and prevention programs. A cross-sectional design was used to obtain workers lifestyle data by analyzing lifestyle questionnaire results and medical check-up data which includes central obesity, triglycerides, HDL, blood pressure and fasting blood sugar. There were significant relationships between physical activities with metabolic syndrome. No significant relationship was found between diet pattern, sleep duration, and knowledge of metabolic syndrome. Promotion and preventive controls are needed to prevent the metabolic syndrome in population, and screening of metabolic syndrome in all workers need to perform by the company to find out the magnitude of the problems.

Keywords: Metabolic syndrome, occupational health, coal mining

INTRODUCTION

The metabolic syndrome (METS) consists of five factors for Atherosclerotic Cardiovascular Disease (ASCVD), that is atherogenic dyslipidemia, high blood pressure, dysglycemia, pro-thrombotic state, and inflammatory state, which occurs most often in obese people. The contribution of each component to cardiovascular risk necessarily varies between individuals but, in combination, both multiply the risk of ASCVD (¹).

According to the American Heart Association / National Heart, Lung, Blood Institute update ATP III MS and IDF report, the main purpose for diagnosing METS is to identify patients at high risk of heart disease and type 2 diabetes mellitus who require lifestyle therapy to reduce this risk (²). Most people with METS are obese and do not settle. Urbanization and access to cheap food create a pandemic of METS. Thus, primary interventions should be lifestyle changes, ie calorie restriction, improved food quality, and increased physical activity (¹).

Some research on METS of International Diabetes Federation (IDF) decided to use the definition of ATP III 2001 as a starting point and modify and update it to reflect the current goals (³). According to a new definition, a person suffering from METS, they should have central obesity plus two of the other four additional factors. These four factors were elevated triglyceride levels ≥ 1.7 mmol / l (150 mg/dl), decreased HDL cholesterol: <1.03 mmol / l (40 mg/dl) in men and <1.29 mmol / l (50 mg/dl), in women (or specific treatment for these lipid abnormalities), elevated blood pressure (systolic ≥ 130 or diastolic 85 mmHg) or treatment of previously diagnosed hypertension, fasting blood glucose ≥ 5.6 mmol / l (100 mg/dl) or previously diagnosed type 2 diabetes.

METS was found in 22.8% and 22.6% of US men and women. METS was found in 4.6%, 22.4%, and 59.6% of men of normal weight, overweight, and obese,
respectively, and a similar distribution was observed in women. Older age, postmenopausal status, Mexican American ethnicity, higher body mass index, smoking, low household income, high carbohydrate intake, and physical inactivity were associated with increased likelihood of METS \(^{(4)}\).

A METS-related study conducted on executive workers in Jakarta in 2011 showed that in general, the prevalence of METS was high (21.6%). The prevalence of METS in male executives (24.7%) was higher than for female executives (11.8%). Demographic, lifestyle, sex, and physical activity characteristics are associated with METS \(^{(5)}\).

XYZ is a coal mining company, where the mining processing environment takes place has a health impact. Based on preliminary research by reviewing HIRADC (Hazard Identification Risk Assessment and Determining Control), medical check-up result and clinic visit found that disease that occurs among workers not only related to work environment but related to work behavior and healthy lifestyle.

**MATERIAL AND METHOD**

This cross-sectional study used questionnaire and medical check-up in 2017. This study aimed to describe the prevalence and factors related to METS in coal mining company XYZ. Hypothesis test using Chi-Square test and T-test to see the relation between dietary pattern, physical activity, sleep duration and knowledge with METS. Research conducted at XYZ, a coal mining company operating in South Kalimantan. The study was conducted in January - May 2018. The population study is the workers of XYZ coal mining site of South Kalimantan. From the total of 196 workers, 105 workers selected after adjusting with inclusion criteria. This research was using FFQ to get dietary pattern information, GPAQ for physical activity and questionnaire that develop by the researcher for sleep duration and knowledge.

**FINDINGS**

**Table 1** Prevalence of METS From 2012-2017

<table>
<thead>
<tr>
<th>Year</th>
<th>METS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>7,5%</td>
<td>92,5%</td>
</tr>
<tr>
<td>2013</td>
<td>6</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>6,1%</td>
<td>93,9%</td>
</tr>
<tr>
<td>2014</td>
<td>17</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>17,3%</td>
<td>82,7%</td>
</tr>
<tr>
<td>2015</td>
<td>16</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>16,2%</td>
<td>83,8%</td>
</tr>
<tr>
<td>2016</td>
<td>20</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>20.6%</td>
<td>79,4%</td>
</tr>
<tr>
<td>2017</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>47,8%</td>
<td>52,2%</td>
</tr>
</tbody>
</table>

The prevalence of METS obtained by analyzing medical check-up result. It was found that METS in miners increase from 2012-2017. In 2017, employees with METS were 47.8%, while those without METS were 52.2%.

**Table 2** Distribution of Component METS in 2017

<table>
<thead>
<tr>
<th>Component</th>
<th>Normal</th>
<th>Abnormal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Central Obesity</td>
<td>58</td>
<td>63%</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>33</td>
<td>35,9%</td>
</tr>
<tr>
<td>HDL</td>
<td>50</td>
<td>54,3%</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>11</td>
<td>12%</td>
</tr>
<tr>
<td>Fasting Blood Sugar</td>
<td>84</td>
<td>91,3%</td>
</tr>
</tbody>
</table>

The METS component which many respondents had is a high blood pressure of (88%), followed by triglycerides, HDL, central obesity, and fasting blood sugar respectively.
Table 3 Distribution of METS Based on Numeric Independent Variable

<table>
<thead>
<tr>
<th>METS</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
<th>SE</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No METS</td>
<td>33,30</td>
<td>100,00</td>
<td>68,76</td>
<td>15,616</td>
<td>2,254</td>
<td></td>
</tr>
<tr>
<td>METS</td>
<td>69,89</td>
<td>16,49</td>
<td>2,485</td>
<td>0,736</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It was found that there was no difference in the mean score of knowledge in the group who had METS and did not have METS (p-value = 0.736). In the group with METS, the mean score was 68,76, whereas in the group with no METS the mean score was 69,89.

Table 4 Distribution of METS Based on Categoric Independent Variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Yes</th>
<th>No</th>
<th>P-value</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep duration</td>
<td>Short sleep duration (&lt;6 hours)</td>
<td>57,1</td>
<td>42,9</td>
<td>0,364</td>
</tr>
<tr>
<td></td>
<td>Long sleep duration (&gt;8 hours)</td>
<td>43,8</td>
<td>56,3</td>
<td>0,904</td>
</tr>
<tr>
<td></td>
<td>Normal sleep duration (6-8 hours)</td>
<td>45,5</td>
<td>54,5</td>
<td></td>
</tr>
<tr>
<td>Diet Pattern</td>
<td>Often</td>
<td>2 (33,3)</td>
<td>4 (66,7)</td>
<td>0,469</td>
</tr>
<tr>
<td></td>
<td>Rare</td>
<td>42 (48,8)</td>
<td>44 (51,2%)</td>
<td></td>
</tr>
<tr>
<td>Physical Activity</td>
<td>Inactive (&lt;600 METs-min per week)</td>
<td>15 (68,2)</td>
<td>7 (31,8)</td>
<td>0,032</td>
</tr>
<tr>
<td></td>
<td>Active (≥600 METs-min per week)</td>
<td>29 (41,4)</td>
<td>41 (58,6)</td>
<td></td>
</tr>
</tbody>
</table>

Bivariate analysis showed that there was no difference in the proportion of metabolic syndrome in the type of food consumed rarely and often consumed. In the diet often groups as much as 48,8% had METS and on rare diet groups as much as 33,3% had METS. The odds -ratio (OR) value obtained at 0,524 (95% CI 0,091-3,012); it means that diet often has a risk for METS of 0,524 times compared with rare diet. The results showed that there was no significant relationship between frequent food intake with METS (p-value = 0,469).

In variable sleep duration, the group that had the highest percentage of METS was the short sleep duration group, which was 57,1% with an OR value of 1,600 (95% CI 0,580-4,412). The OR value for the long sleep duration group was obtained at 0.933 (95% CI 0,304-2,864). However, it can be seen from the p-value, both short sleep duration and long sleep duration are not related to the METS (p-value = 0,364; p-value = 0,904).

The results of data analysis demonstrated that there is a difference in the proportion of METS in both groups of physical activity. The OR value was obtained at 3,030 (95% CI 1.097-8,363); it mean that less physical activity had a risk of METS of 3,030 times compared to active physical activity. P-value showed that there was a significant relationship between physical activity with METS (p-value = 0,032).

**DISCUSSION**

Based on the results of research on 92 mining workers XYZ coal mining company located in South
Kalimantan found the prevalence of METS in 2017 amounted to 47.8%. When compared with previous research on METS in Indonesia, this result higher than result from Soewondo’s study 28.4%. (6)

According to the consensus of the definition of METS, there was the fact that METS was a progressive disease and increases the risks of ASCVD, for example, some components tend to worsen over time. Some things that usually increase annually are weight gain, gradual loss of muscle mass, stiffness in the arteries, decreased capacity of pancreatic beta cell secretion, mitochondrial dysfunction, and increased inflammatory changes in adipose tissue, and age-related (1).

The largest component of the METS contributing to this study was high blood pressure obtained in 88% of respondents.

**Dietary Pattern**

Food intake is a determinant factor in the diet, which is described in the frequency of eating, skips breakfast and eating habits outside the home associated with obesity. It has been agreed that a high-fat diet will increase total energy intake and increase the likelihood of obesity. (7)

Assessment of the frequency of food consumption was done using the Food Frequency Questionnaire (FFQ). Food consumption was divided into carbohydrates, animal protein, vegetable protein, vegetables, fruit, milk and its products, fast food, snacks and soft drinks. After obtaining the overall food frequency data, then the food ingredients are determined which are at risk of causing METS. In this study, diet pattern was not related with METS. This result was not in line with several studies that suggest that diet was related with METS. Dietary patterns characterized by high consumption of fish and foods with whole grains and low consumption of processed products, sugar and sweets and preserved meat are associated with a lower risk of METS with a reduced risk of lower HDL cholesterol concentrations and increased glucose concentration (9). This might be happening because there was no difference in the variety of food consumed by each worker because the company has provided canteen facilities and meal menu settings.

**Physical Activity**

Physical inactivity increases the risk of CVD and types 2 diabetes mellitus and other can worsen other risk factors. Increased physical activity promotes weight loss and maintenance in obese people and modifies obesity-related risk factors, including increasing visceral adipose tissue loss, improving insulin sensitivity, increasing HDL cholesterol, and decreasing triglyceride levels (4).

The results of this study showed that workers who were an inactive category (<600 METs-minutes per week) 3 times (OR = 3,030) were at risk of having METS compared with workers who were an inactive category and statistical tests showed that physical activity significantly related with the incidence of METS. These findings are in line with studies showing that the percentage of adults who do most of the sedentary activity was more at risk of developing METS (9) 21.4% of the participants studied had 3 or more risk factors for METS with low HDL levels as the most risk factor, Moderate-Vigorous Physical Activity (MVPA) with at least 10 minutes per session, Low Physical Activity (LPA) and body mass index explained 16% HDL variation. (10)

**Sleep Duration**

Sleep duration was not significantly related with METS. Sleep was recognized as an important mediator in an individual’s health status. Given that the number of short and long sleep gradually increases (11). The results of this study are not in line with some studies that have reported that short sleep hours (generally less than 6 hours per day) or long (generally more than 8-9 hours per day) sleep duration was associated with an increased risk of chronic diseases such as obesity, hypertension, diabetes, and METS (12).

Several studies have reported that short sleep duration was associated with an increased risk of METS, but conversely, long sleep duration was not associated with METS (13–15).

In this study, there was no association between short sleep hours and long sleep hours with METS. This was due to the working hours arranged by the company so that very few workers work overtime or leave early. Workers who live in the company accommodation can go straight back home to rest, and workers living outside the company accommodation are provided with shuttle buses so that they return home on time. With a working system like this, it was very possible for a person to return to his place of residence and immediately rest.
Knowledge

Worker’s knowledge was measured using a questionnaire that contained several questions about METS. None of this research results are suitable for groups that are not with METS. The results show that no difference in the scores of knowledge in the group who had METS and did not have METS. This was in line with Kamso et al (2011) research on the groups in Jakarta who see the level of education as the uniqueness of the METS. In the study, there was no significant relationship between education and METS. This was in contrast to several studies that have shown that the level of education has a significant relationship with METS

Previous studies show that women have a lack of understanding of diet and exercise in reducing CVD. One way to reduce CVD incidence was to improve adherence to healthy lifestyles by educating, filtering, detecting and treating the modifiable risk factors because women do not practice heart-healthy behavior on a regular basis. This attributed to their limited knowledge and lack of attention and knowledge to CVD which can lead to poor motivation to change behavior

CONCLUSION

Dietary pattern, sleep duration, and knowledge were not related to METS. Factor contributed to METS in miners based on the results of was physical activity. Promotion and preventive controls are needed to prevent the METS in population. The researcher suggests performing screening of METS in all workers to find out the magnitude of the problems that occur in the company. It is necessary to improve physical activity and exercise programs for workers who had METS and all workers.

Conflict of Interest: Hereby the authors declared that there is no conflict of interest in this research with any other parties.

Ethical Clearance: This research has been approved by Ethical Board Committee, Faculty of Public Health University Indonesia and has been approved for ethical clearance by Ethical Board Committee, Faculty of Public Health University Indonesia.

Acknowledgment: This work was supported by Hibah PITTA 2018 funded by DRPM Universitas Indonesia No.5000/UN2.R3.1/HKP.05.00/2018.

REFERENCES


Correlation Analysis of Sleep Duration, Dietary Habits, Physical Activity and Knowledge with Blood Pressure on Engineering Workers, Procurement, and Construction (EPC)

Wardatul Hamro¹, Robiana Modjo¹

Occupational Health and Safety Department, Faculty of Public Health, Universitas Indonesia, Kampus UI, Depok, 16424, Indonesia

ABSTRACT

Background: There have been five cases of hypertension to EPC workers in the last five years (2012-2017). To minimize the risk of hypertension in workers and to prevent greater losses in terms of productivity and medical costs arisen from the disease, it is necessary to acknowledge the distribution of blood pressure in EPC workers and analyze any factors related to blood pressure, as a screening of hypertension occurred related to worker health promotion program.

Objective: The aim of this study is to analyze the risk factors associated with blood pressure (systolic, diastolic) on workers of EPC.

Method: A quantitative approach in a cross-sectional design which comprised the subjects of the study as samples are 97 workers of EPC

Result: The systolic blood pressure (SBP) and diastolic blood pressure (DBP) is higher among workers with abnormal sleep duration (SBP: 125,15±8,57, DBP: 84,71±6,02), frequently dietary habits in fast food consumption (SBP: 140,00±0,00, DBP: 90,00±0,00), lack of physical activity (SBP: 122,75±9,20) and lack of knowledge about hypertension. There were significant differences in the mean systolic (R² = 0,049) and diastolic blood pressure (R² = 0,061) in workers in the form of sleep duration.

Conclusion: The majority of worker’s blood pressure is categorized prehypertension based on blood pressure category by JNC-7. Results indicate that abnormal sleep duration, the frequency of protein consumption, physical activity that does not fit with the recommendation and lack of knowledge about hypertension contribute to higher of worker’s blood pressure.

Keywords: blood pressure (systolic, diastolic), risk factors, EPC workers

INTRODUCTION

Hypertension is regarded the main factors of heart disease and stroke which lead to premature death worldwide. At least, 970 million people experiencing hypertension. In high-income countries, about 330 million people experienced hypertension compared to about 640 million people in developing countries. By 2025 it is estimated that there will be 1.56 billion adults living with hypertension (1).

Several factors related to hypertension comprised of modifiable risk factors (lack of physical activity, unhealthy diet, obesity, alcoholism, sleep apnea, high cholesterol, diabetes, smoking, and stress) and unmodified risk factors (family history, age, gender, and chronic kidney disease ³). Many studies linked genetic factors, such as age, sex, ethnicity and family history and lifestyle factors, such as alcohol consumption, smoking, poor diet, lack of physical activity, stress with hypertension (2). Furthermore, some research mentions that hypertension is related to the level of knowledge (³).

EPC company, whose biggest asset is workers, is engaged in providing engineering, procurement and construction services for development and maintenance.
of oil and gas companies. It is expected that workers are able to maintain their health, resulting in more productivity to perform. Yet, there occurred five cases of hypertension in EPC company over the past five years (2012-2017). Nevertheless, a health promotion program is not available in the company which causing them hardly to prevent and control risks of hypertension. In order to minimize the risk of hypertension in workers and to prevent greater harm in terms of productivity and medical costs due to hypertension in EPC company, it is crucial to measure the frequency distribution of blood pressure among the workers and analyze the factors which contributed to the elevation of the blood pressure.

**MATERIAL AND METHOD**

This cross-sectional study aimed to determine the correlation between the independent and dependent variable. This research was conducted in an EPC company from January to June 2018 where gathering 97 workers. The study conducted BP measurement using sphygmomanometer by a competent paramedic. An interview-administered questionnaire was used to collect data, which included the respondent’s identity, knowledge, sleep duration, physical activities, and food frequency. Workers knowledge was recorded by the questionnaire adopted from American Heart Association (AHA). Data on self-reported physical activity were collected using the Global Physical Activity Questionnaire (GPAQ) by WHO, whereas the food frequency was adopted from the FFQ (Food Frequency Questionnaire). The data were analyzed with the SPSS program, univariate and bivariate data analysis using comparative hypothesis testing which is the Mann-Whitney test.

**FINDINGS**

The bivariate analysis of two variables, BP and modified risk factors, showed that the mean of SBP and DBP are higher among workers with abnormal sleep duration (SBP: 125.15±8.57, DBP: 84.71±6.02), frequently dietary habits in fast food consumption (SBP: 140.00±0.00, DBP: 90.00±0.00), lack of physical activity (SBP: 122.75±9.20) and lack of knowledge about hypertension (SBP: 122.59±9.88, DBP: 82.21±9.52), this finding may contribute to high BP among workers. Whereas, in the dietary habit, frequently protein consumption has the highest average SBP (124.09±10.21) while the frequency of rarely protein consumption has the highest average DBP: 82.21±9.52), this finding may contribute to high BP among workers. Whereas, in the dietary habit, frequently protein consumption has the highest average SBP (124.09±10.21) while the frequency of rarely protein consumption has the highest average DBP: 82.21±9.52), this finding may contribute to high BP among workers. Whereas, in the dietary habit, frequently protein consumption has the highest average SBP (124.09±10.21) while the frequency of rarely protein consumption has the highest average DBP: 82.21±9.52), this finding may contribute to high BP among workers.

| Table 1 Blood Pressure Distribution (Systolic, Diastolic) Based on Modifiable Risk Factors in EPC Workers |
|-----------------------------------------------|--------|--------|----------------|--------|--------|
| Variable                                      | SBP    |       |                | DBP    |       |
| Mean (Min-Max)                                | SD     | %     | Mean (Min-Max) | SD     | %     |
| Sleep duration                                |        |       |                |        |       |
| Abnormal (=6 hours, or >8 hours)              | 125.15 | 8.57  | 35.1%          | 84.71  | 6.02  |
| Normal (6-8 hours)                            | 120.71 | 9.79  | 64.9%          | 80.32  | 9.28  |
| Dietary habit - Protein (red meat)            |        |       |                |        |       |
| Frequently                                   | 124.09 | 10.21 | 88.6%          | 81.63  | 8.59  |
| Rarely                                       | 122.03 | 9.53  | 11.34%         | 83.64  | 8.09  |
| Never                                        |        | 0     |                |        | 0     |
| Dietary habit - Fast Food                    |        |       |                |        |       |
| Frequently                                   | 140.00 | 10.11 | 49.48%         | 82.39  | 8.81  |
| Rarely                                       | 121.76 | 9.38  | 50.52%         | 81.33  | 8.27  |
| Never                                        |        | 0     |                |        | 0     |
| Dietary habit - Beverages (coffee, Soda, Alcohol) |        |       |                |        |       |
| Frequently                                   | 117.28 | 10.09 | 11.34%         | 78.18  | 8.15  |
| Rarely                                       | 123.32 | 9.33  | 50.52%         | 82.87  | 8.52  |
| Never                                        | 121.39 | 9.67  | 41.2%          | 80.28  | 8.31  |
| Physical activity                            |        |       |                |        |       |
| Not fit the recommendation (<600)            | 122.75 | 9.20  | 58.8%          | 81.84  | 8.85  |
| Fit the recommendation (<600)                | 121.93 | 9.90  | 53.6%          | 82.21  | 9.52  |
| Knowledge                                    |        |       |                |        |       |
| Lack (<70)                                    | 122.59 | 9.88  | 46.4%          | 81.44  | 7.27  |
| Good (>70)                                    | 121.89 | 9.31  | 9.52  | 3.536  | 5.36%  |
Presents results from statistic test against differences in mean BP on modifiable risk factor variables. The only statistically significant variables were sleep duration against SBP ($R^2 = 0.049$) and DBP ($R^2 = 0.061$). Whereas, other modified risk factors such as dietary habits-protein (SBP $R^2 = 0.065$; DBP $R^2 = 0.066$), fast-food (SBP $R^2 = 0.070$; DBP $R^2 = 0.072$), snacks (SBP $R^2 = 0.058$; DBP $R^2 = 0.075$), beverages (SBP $R^2 = 0.069$; DBP $R^2 = 0.076$), physical activity (SBP $R^2 = 0.070$; DBP $R^2 = 0.076$) and knowledge (SBP $R^2 = 0.070$; DBP $R^2 = 0.076$) did not show significant results, meaning there was no difference in mean BP between categories in these variables against SBP and DBP.

**DISCUSSION**

Our findings showed that dietary habit, mean of BP among workers is higher in frequently consumption of fast food and beverages such as coffee, alcohol, and soda. Supporting to our findings, Ugorji (4) stated that the implementation of the Dietary Approach to Stop Hypertension (DASH) intervention program for African-American women with hypertension doing a healthy diet by consuming fruits, vegetables, low-fat dairy products and increasing potassium intake can reduce SBP by 8-14 mmHg and reduce sodium intake by consuming no more than 100 mmol (2.6 grams of sodium or 6 grams of sodium chloride) per day can reduce SBP by 2-8 mmHg (4,5).

In our study, similar with a study conducted by Bosu (6), workers with physical activity which unmeet with WHO recommendations (MET < 600) have a greater average blood pressure compared to the group with WHO recommendations of physical activity (MET ≥600). Bosu (6) suggested that the prevalence of hypertension was significantly higher in people with low physical activity compared with people who performed moderate or intense physical activity. This applies to workers with high activity demands such as car workers, plant operators and planter who have a lower prevalence of hypertension compared to workers in individually task such as traders, executives, and civil service (6,7). In sleep duration, the mean difference of SBP and DBP in respondents who had abnormal sleep duration was higher than respondents who had normal sleep duration, similar to Gangswisch study (8). Sleep duration of ≤5 hours per night was significantly associated with increased risk of hypertension (hazard ratio, 2.10; 95%, CI, 1.58-2.79) with the age range of the study subjects as 32-59 years.

This study underlines that workers with lack of knowledge about hypertension have higher SBP and DBP compared to workers with good knowledge. The earlier study showed that knowledge about hypertension is better for participants who have control than participants who did not, then the results of the logistic regression model analysis showed that men participants (OR = 1.31) with better knowledge of hypertension (OR = 1.19), awareness of suffering from hypertension (OR = 2) and adhering to regular treatment (OR = 1.48,) are more likely to control hypertension.

Our findings highlight several modifiable factors which are sleep duration, dietary habit, physical activity, and knowledge, only the sleep duration variable, have a correlation with systolic blood pressure with $R^2 = 0.049$. The correlation between sleep duration and high BP had been examined in Song (9). This study revealed that respondents who had sleep duration <6 hours had higher mean SBP (111.9 ± 0.9) compared with respondents who had a duration of sleep 6 - 8 hours (108.9 ± 0.3) and >8 hours (106.7 ± 0.7) with $R^2 = 0.049$, while the mean DBP was also related to sleep duration, respondents with sleep duration <6 hours had the highest mean diastolic blood pressure (73.8 ± 0.6) with $R^2 = 0.061$. It occurs due to excess sympathetic nerve activity after a short period of sleep, if short duration of sleep continues, structural adaptations such as left arterial and ventricular hypertrophy can occur due to an increase in hemodynamic load, so that the cardiovascular system is adjusted to maintain a higher blood pressure balance. Several other studies have shown that this finding usually occur in women, the mechanism has not been clearly identified, but this may be due to hormonal and psychosocial changes associated with menopausal (9). Moreover, it is suggested that an increase in systolic blood pressure due to insufficient sleep can be related to the risk of isolated systolic hypertension in the future, besides the possibility of decreasing sleep duration can be related to hardening of the material which will cause arteriosclerosis and isolated systolic hypertension (10).

**CONCLUSION**

The findings show that the majority of workers’ BP is determined prehypertension based on BP category by JNC-7. Evidence of this study indicates that modified risk factors (abnormal sleep duration, the frequency of protein consumption, proper physical activity and lack of knowledge about hypertension) contribute to higher
of worker’s blood pressure. Data analysis signify that there were significant differences in the mean SBP in workers in the form of sleep duration.

Conflict of Interest: Hereby the authors declared that there is no conflict of interest in this research with any other parties.

Acknowledgment: This study was supported by Hibah PITTA 2018 funded by DRPM Universitas Indonesia No.5000/UN2.R3.1/HKP.05.00/2018.

Ethical Clearance: This research has been approved by Ethical Board Committee, Faculty of Public Health University Indonesia and has been approved for ethical clearance by Ethical Board Committee, Faculty of Public Health University Indonesia.

REFERENCES
10. Angles J, Kenarsary A, Paddock S, Schuck Z. The Physiological Relationship of Sleep Duration with Blood Pressure, Heart Rate, and Reaction Time.
Phenotypic and Molecular Study of mecA Gene in MRSA Isolated from Clinical Cases in Misan Province /Iraq

Zahid S. Aziz¹, Marwa A. Hassan²
¹Assistant Professor Dr and Head of the Department of Biology, ²Postgraduate Student, University of Misan, College of Science, Department of Biology, Misan, Iraq

ABSTRACT

Methicillin-Resistant Staphylococcus aureus (MRSA) is a common strain of S. aureus caused infections lead to increased of risk in clinical outcomes and death, and compared with infections caused by non-resistant strains of the same bacteria patients consume more resources of health-care, where their hospitalization was prolonged because most preferred drugs such as β-lactam antibiotics not have the ability to produce bactericidal effect on this bacteria. Therefore this study aimed to: Isolation and identification of MRSA by using conventional and confirmatory techniques, detection of phenotypic traits related to their antibiotic resistance and estimation the occurrence of mecA gene in identified bacteria. A total of 274 samples, were collected from local hospitals in Misan Province during the period from December 2017 to April 2018. Diagnostic results using microscopic, cultural, biochemical tests and vitek 2 system proved that 106 bacterial isolates belong to Staphylococcus aureus. The susceptibility test of S. aureus isolates was performed toward many types of antibiotics, from all isolates 99(93.4%) were determined as MRSA by oxacillin antibiotic and 93(87.7%) were determined as MRSA by cefoxitin antibiotic. The results of molecular estimation of mecA gene showed that 89(89.9%) and 91(97.8%) from phenotypically positive MRSA isolates had this gene for oxacillin and cefoxitin antibiotics respectively.

Keywords: Staphylococcus aureus, MRSA, Antibiotic resistance, mecA gene.

INTRODUCTION

Methicillin-Resistance Staphylococcus aureus (MRSA) is a pathogenic bacteria causing diseases extended from surface skin and tissue infections to severe and lethal infections.¹,² It has been generally considered as a public health problem, thus it was classified into two different groups, community-acquired (CA-MRSA) and healthcare-acquired (HA-MRSA).³,⁴

MRSA has the capacity to rapidly develop drug resistance.⁵ Because it can develop several mutations conferring it high resistance for wide range of antibiotics.⁶ Penicillin binding proteins (PBPs) involved in the collecting of the peptidoglycan in bacterial cell wall. These proteins have a high affinity to β-lactams, by bind these antibiotics the active site of PBPs thus cell wall synthesis inhibited.

PBP2a alternative proteins with low tropism to these antibiotics.⁷ So PBP2 continues in cell wall synthesis even in the presence of high concentrations of β-lactam antibiotics.⁸ These proteins encoded by mecA gene, which carrying on a mobile genetic element called Staphylococcal chromosomal cassette mec (SCCmec).⁹ The transcription of this gene regulated by two regulatory systems that mecI-mecR1 and the penicillinase blaR1-blaI-encoded regulatory elements.¹⁰ The majority of researches in this field suggested that mecA gene presented in all MRSA strains.¹¹ Thus it considered the corner stone responsible for MRSA phenomenon.¹² Also MRSA produce a β-lactamase enzyme, which damages the functional perfection of the β-lactam antibiotics by split the β-lactam ring of penicillin molecules.¹²

MATERIALS AND METHOD

Collection of samples

A total of 274 samples, were collected from different clinical cases (Burns, Wound, Nasal, Oral, Ear, Throat, Vaginal, Bedsore and Urinary tract infections) from local hospitals in Misan Province during the period from December 2017 to April 2018. Collected swabs were
streaked on mannitol salt agar then incubated at 37°C for 24 hours, the suspected colonies depending on the morphological bases were selected for the identification by conventional methods and Vitek2 system.

**Antimicrobial susceptibility test**

Susceptibility testing was determined by the agar disk diffusion method,\(^{[13]}\) and national committee for Clinical and Laboratory Standards Institute guidelines,\(^{[14]}\) using antibiotics utilizes as conventional therapy for MRSA infections.

**Extraction of bacterial chromosomal DNA**

DNA extraction was done toward *S. aureus* isolates according to Presto™MinigDNA Bacteria Kit protocol. The Chromosomal DNA then subjected to monoplex PCR. The integrity of extracted DNA was tested using Agarose Gel Electrophoresis.

**Molecular estimation of mecA gene using PCR technique**

The protocol used depending on Bioneer manufacturer’s instructions. All PCR components were assembled in PCR tube. The specific primer for *mecA* gene have been choose according to \(^{[15]}\) as in table (1), was prepared by the company of Bioneer, South Korea.

**Table (1): Primers used in this study**

<table>
<thead>
<tr>
<th>Gene</th>
<th>Primer sequences (5’ → 3’)</th>
<th>Product length (bp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mecA</td>
<td>F: CGGTAACATTTGATCGCAACG R: TTTGCCAACCTTACCATCG</td>
<td>985</td>
</tr>
</tbody>
</table>

Then template DNA and primers were added into the AccuPower®. Taq premix tubes for get 20ml reaction volume. Eppendorf PCR tubes were placed in the thermocycler (Eppendorf, Germany) and the right PCR cycling program parameter conditions were conducted as in table (2), then seven microliters of amplified PCR product were loaded to the agarose gel wells with standard molecular weight of DNA ladder was loaded in one well and running using TBE 1X buffer was added to the electrophoresis tank, tray with agarose was immersed in electrophoresis tank. Electrophorese run at 65 volt for 120 min, the gel stained with 0.5 µg/ml of ethidium bromide was visualized by Gel Documentation.\(^{[16]}\)

**Table (2): PCR cycling program parameter conditions**

<table>
<thead>
<tr>
<th>Genes</th>
<th>Temperature °C/ time</th>
<th>Cycling conditions</th>
<th>Final extension</th>
<th>Cycles number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial denaturation</td>
<td>Denaturation</td>
<td>Annealing</td>
<td>Extension</td>
</tr>
<tr>
<td>mecA</td>
<td>95/5 min</td>
<td>95/45 sec</td>
<td>55/1 min</td>
<td>72/2 min</td>
</tr>
</tbody>
</table>

**RESULTS AND DISCUSSION**

**Susceptibility test**

The results of susceptibility testing showed that all *S. aureus* isolates were multi-drug resistant (MDR) when done toward 18 antibiotics from different groups, therefore the percentage of resistance of these isolates is that; β-lactam group: Methicillin, Ampicillin, Oxacillin, Cefoxitin, Cefotaxime which showed percentage of resistance were 100, 98.1, 93.4, 87.7, 84% respectively, to Erythromycin was 80.2%, to Tetracycline and Doxycycline were 79.2, 56.6% respectively, and to Trimethoprim-sulfamethoxazole the resistance was 71.7%.
The resistance to Gentamicin and Amikacin appeared in 63.2, 49.1% of *S. aureus* respectively and the rate of resistance was 61.3% to Rifampin. *S. aureus* isolates also were resistant to Levofloxacin and Ciprofloxacin in rate 59.4, 49.1% respectively, to Clindamycin was 51% and to Vancomycin was 50%. The rate of resistance to Imipenem was 47.2%, while to Nitrofurantoin was 38.7%.

The bacterial isolates show a contrast in antibiotics resistance, due to the diversity in the mechanisms of resistance of *S. aureus* isolates such as the production of PBP2a and ß-lactamase enzymes that inhibit these antibiotics.\(^{[17]}\) The reason for the other depends on the virulence factors of bacteria, where some isolates show amount of virulence more than others,\(^{[18]}\) as well as the difference in the sources of sampling, tests circumstances and the type of techniques that used in the study, all these combined may lead to a difference in resistance and sensitivity levels.\(^{[19]}\) The point of high resistance is noticeable, because it may lead to failure in therapy, extended disease, increased health care expenses and death.\(^{[20]}\)

Out of 106 *S. aureus* isolates 99(93.4%) and 93(87.7%) were identified as MRSA determined by oxacillin and cefoxitin antibiotics respectively, because for susceptibility testing now typically uses oxacillin and/or cefoxitin.\(^{[21]}\) Oxacillin can be considered a representative antibiotic for susceptibility test to all ß-lactams.\(^{[4]}\) Cefoxitin also used for MRSA detection, because it is a powerful influence of *mecA* gene that shows to be less affected than oxacillin by isolates have the ability to produce penicillinase excessively.\(^{[21]}\)

**Molecular estimation of meca**

Polymerase chain reaction technique (PCR) utilize in the amplification of *mecA* gene. This gene is one of the most common and important virulence genes in *S. aureus* where it considered the primarily gene responsible for the widely antibiotic resistance, therefore was selected in this study. Also the molecular amplification of this gene is recognized as a hallmark to diagnose MRSA because these genes are highly conserved among these bacteria.\(^{[11]}\)

The results for *mecA* gene detection illustrate that 89(89.9%) and 91(97.8%) from phenotypically positive MRSA isolates had this gene for oxacillin and cefoxitin respectively, figure (1-A,B). In present study the occurrence of *mecA* gene was higher than that obtained by other researchers such as\(^{[22-26]}\) which were (18.8, 29, 39.2, 45.1, 54.5%) respectively. While other studies revealed that the percentage of incidence of *mecA* gene has been more than this study such as\(^{[11, 27-30]}\) which were (90.2, 95, 96, 98.1, 98.3%) respectively.

![Figure 1-A: Ethidium bromide-stained Agarose Gel Electrophoresis of meca gene of MRSA isolates, Lane M DNA molecular size Ladder (100-2000)bp, Lane with positive marker refer to the isolates that have meca gene, Lane with negative marker refer to the isolates that not have this gene.](image)
According to the results in present study we can concluded that cefoxitin is more reliable than oxacillin in MRSA identification, and this confirmed by study conducted by.[31] Therefore it currently recommended by CLSI (2017) for MRSA detection.

*S. aureus* which phenotypically positive MRSA while gave a negative results to *mecA* gene, this could be referred they have an alternative mechanism instead of this gene for antibiotic resistance including the alteration of the penicillin binding proteins (PBPs) leading to the hyper-production of methicillinase or β-lactamase,[14] subsequently this can explain why not all isolates that resistant to β-lactams not have this gene.

The studies has been showed that 90% of *S. aureus* resist penicillins due to β-lactamase (penicillinase) production,[33] also[34] confirmed that resistance to penicillins occur also by the production of transmembrane proteins associated with the cell wall. These proteins represent enzymatic activity such as Transpeptidases and carboxypeptidases a target of penicillins and cephalosporins, where it works to change the target of β-lactams.[35] The study of [36] affirmed the role of plasmids in the production of β-lactamase enzymes and their responsibility on the encoding of some PBP2a, and study by[33] has been linked between the resistance to antibiotics and sources responsible for this resistance, where they were found that most of the resistance shown by the strains of *S. aureus* has plasmid origin.

**CONCLUSIONS**

MRSA strains have a high resistance to β-lactam group and most other antibiotics, the greatest antibiotic resistance in this study is returned to the isolates that taken from burns and wounds, cefoxitin antibiotic is more reliable than oxacillin antibiotic in MRSA detection and the *mecA* gene was high prevalence within MRSA strains.

**Conflict of Interest:** There are no conflict of interest.

**Source of Funding:** Self source funding

**Ethical Clearance:** It is no behalf of authors certify that the research conducted after being got official ethics clearance.

**REFERENCES**


A Solution for Nosocomial Infection in Healthcare Facilities

Yasaman Parsia¹, Puteri Fadzline Mohamad Tamyez²

¹Researcher, ²Senior Lecturer, University Malaysia Pahang, Pahang, Malaysia

ABSTRACT

Cross-infections in healthcare facilities, collectively known as Nosocomial Infection (NI), remain a global issue. Numerous people in Healthcare facilities (HFs) die all the time due to the spread of such diseases, specially NIs. Governmental HFs are burdened with increased expenses as a result of the unchecked transmission of cross-infections across their departments. This conceptual paper, firstly, attempts to present the severity of NI prevalence and propose a hypothesis in discussions of the role of HF layouts in controlling such cross-infections. Lastly, it focuses on the comprehension for controlling of the risks of cross-infections transiting between HF departments and facilities.

Keywords: Nosocomial infections, cross infection, healthcare facility, Risky departments.

INTRODUCTION

A healthy societal culture is one that is educated, work-oriented, and makes contributions to the arts while providing services that are usually inaccessible to less healthy societies (¹, ²). Therefore, societies have developed obligations for provisioning better health services to every patient (¹, ³). Among such measures would be the establishment of more Healthcare Facilities (HF) units within various regions throughout the country, which could lead to increased prosperity that brings improvements to people’s quality of life (⁴).

For every healthcare facility, there are certain problems that can affect institutional service quality. Increasing healthcare-related errors, injuries among workers, and decreasing patient recovery can all lead to increased nursing and other staff turnover, loss of work time, and further disabilities. Increasing costs as well as infection rates are among the problems which every HF experiences as a result (⁵). Of these, Nosocomial Infections (NIs) are among the main hurdles facing HFs and the medical establishment. This article intends to scrutinise the risk of NIs.

MATERIAL AND METHOD

The current study can be classified as a qualitative research. The valuation of research literature made through reading of published manuscripts from scholarly database. Near 50 manuscripts was studied which comprises articles from the national and global studies with considerable effect on the topic.

First, the literature review tries to present fundamentals of cross-infection especially in HFs. Then, the review of the literature focused on the role of HF layout in controlling of NI risk. Lastly, based on the existing literature, the knowledge gap in this area is highlighted.

FINDING AND DISCUSSION

‘Nosocomial’ as a term derives from the Greek wording of ‘Nosos’ in reference to ‘disease’, along with ‘Komeion’, which refers to care (⁶). NI, also termed as HF cross-infection, comprises a type infectious process whereby patients acquire infections during hospitalisations (⁶-¹⁰). ‘Nosocomial’ describes a disease that is inflicted on patients subject to treatments for other ailments or else undergoing general healthcare (⁷, ¹¹). Berket (⁷) noted that NIs are clinically observed in hospitalised patients or else in subjects who have been discharged for a few days.
A fuller understanding regarding cross-infections followed the early breakthroughs of Pasteur, Koch, and Lister, during the advent of the ‘Bacteriological Era’ of modern science. Microorganisms were found to transfer between objects and persons across sites (12). With late 19th-century medical progress came great Western advances in disinfection and treatment via asepsis. These appeared to signal a final triumph over cross-infections, an achievement that was short-lived however (13). Moreover, as the initial model for this study, the existence of cross-infections in healthcare facilities was first reported by Cruickshank (14) (as mentioned by Ayliffe and Lilly (15)) in his description of Streptococcus pyogenes infections among patients admitted to hospitals. The report by Cruickshank (14) remains the foundational basis for studies of NIs, which this paper also covers. Modern primary care units continue to host dense populations of very ill subjects that are exposed to far greater risks regarding cross-infection (16). NI prevalence is considered to be a primary socio-economic and medical issue that affects all developing as well as developed countries (17,18).

By 1941, memoranda regarding the prevention of NIs in wounds were advising that each hospital appoint ‘. . . full-time specialised officers to supervise infectious disease control . . . ’ (19). By 1944, it was being suggested that all hospitals establish representative committees for doctor, nursing, and laboratory staff as well as administrators, for investigating and designing measures to manage cross-infections (19). The NI pandemic of Staphylococcus aureus from the 1940s through to the 1950s resulted in the mandating of further guidelines (19). Jacoby (20) noted that cross-infections remain a critical problem in HF management. Fisher (21) noted that medical decision-making should regard a germicide’s value (capacity for killing pathogens) on its ability to fight cross-infections and not in terms of price alone.

With several hospitals for communicable diseases being operational in the last century, soon it was realised that contagions occurred not only in surgical and obstetric patients (which was emphasised in the later part of the 19th century) but also in the medical patients. Soon it was realised that several bacterial, as well as viral, contagions spread in HFs and brought about these contagions (13). Also in the recent years, Hertzberg (22) highlights that the threat of spreading of the infections in certain HF units, for instance, SARS (Severe Acute Respiratory Syndrome) epidemic that occurred in 2003, wherein there were 128 instances of patients getting infected from direct or indirect exposure to a patient of SARS (23). Recently, the admission of a patient infected with Ebola virus to HFs in Dallas, Texas, gave rise to a need to test and supervise more than 180 other individuals, among whom several were hospital staff, who had been in close contact with the Ebola virus patient or with 2 other nurses who got infected after being exposed to that patient (22).

Studies have mentioned that several people are infected with NIs across the globe (24, 25). The infection from dispersal of microorganisms in NIs, HFs, cause an unwanted and a grave threat to the healthcare system quality in the nation (17, 18). NIs extend the stay of the HF, causing long-term ailment for the patient, increasing the resistance of the patients to the antimicrobials, can result in death, raises the cost of the HF to be borne by the patients and their families and bring about a tremendous monetary burden on the nation’s present healthcare system (18, 26). On a yearly basis about 400,000 - 600,000 NIs impact the German patients, causing 10,000 – 15,000 deaths (27, 28). NIs are to blame for 37,000 demises in Europe annually (26). Also, 722,000 severe NI cases were reported in the US HFs in the year 2011 (29, 30). Based on a 2016 report, it was stated that, in Pennsylvania, around 247 HFs had provided data (about NIs) to the National Healthcare Safety Network for the duration of a year (31). Also, on any specified day, 1 patient out of every 25 in the HFs would be having at least 1 NI (29, 30). NIs also cause huge economic losses each year. In Europe, these total about €7 billion, which involves direct expenses and causes an additional 16 million-day stay at the HF; also the United States of America registered a loss of $6.5 billion due to NIs (26). Riu, Chiarello (22) calculated the expenditure of 12 hospitals in Spain and noticed that just NIs had been responsible for 64.2 percent of the total expenses of opposing occurrences.

Nowadays, the growth of antimicrobials use and improvements in the medical procedures have caused several invasive processes being utilised on the patients, which in turn increases the risk of new NIs (28). These diseases are still regarded as a hazard to this day in the age of modern antibiotics (7, 33). Congestion in the hospitals, lags in implementing extra precautions, crowding and combining patients having contagious diseases, shifting of patients from one part of the hospital to another, defects in the building structure, insufficient staff preparation and scarcity of personal safety devices.
also play an important role towards the threat of cross-infections (34).

The HF environment is contaminated by several types of infectious organisms and moreover it is a store of the nosocomial microbes that could contaminate the patients at the time of their HF stay (35). Khan 36 mentioned that, while the rates of infection in the various HFs cannot be determined exactly, one can get a rough approximation of these rates based on several dependent parameters like the sort of HFs (i.e., private or public), service offered by these HFs, etc. (38).

Hospital is an instance of a multi-product establishment which provides several facilities like patient care, fitness promotion, training of health personnel, and even assist research regarding health-related issues (5, 37). Every HF structure (such as the hospital) accommodates many divisions which offer their specific services (38). For having a valid HF, several other factors like the quality of design of the HF blueprint must also be taken into account. A good and accommodating HF environment avoids further injuries and also offers help and emotional support to the sick persons during the recuperation process (5).

The physical structure of the HF contributes significantly in regulating NIs and reducing the risk of infection transmission (39). Nonetheless, there are several variations in the layout of the HF around the globe, and regulation of infections by using specific engineering structures is still a matter of debate (40). The technical research is concentrated on resolving the way in which an enhanced design can minimise the threats in the HFs (41). The essential safety risk considerations must be made at the time of the planning phase and must be a recurrent process at the time of reviewing the design (38). Now, it has been understood that the measures for regulating infections must be combined with the design and development of HF structures together with its operations (42). These days, a lot of focus is given to the HF environment and its correlation with health of the patient, which has brought about the development of efficient blueprints (43). Risk of NIs due to shifting of the patients to another hospital or area or to another division in the same facility has been recorded (44). As per Ong (45), cross-infections can take place via transmission of microbes from personnel-to-personnel, patient-to-patient and department-to-department. With regards to the NIs, certain departments are impacted more than the others, and few can be the causes because of the existence of cross-infection. The cause and effect department are termed as risky. Therefore, risky departments are separated from one HF to another; it can be determined from Ducel (46) who substantiate the impact of extent of prevention, policies, type, size, technology and other parameters related to HFs. Although there is considerable amount of evidence which connects the HF environment to the transmission of infections, it is dispersed among several domains and is yet not systematically evaluated (47).

CONCLUSION

Therefore, it can be summarised that for every government of countries and HF, the control of NIs is a significant issue. The theory described in this article implies that NIs has a long history, but till now, no decisive way has been found to minimise the severity of risks for them. In relation to this field, some advancements have been made in medicine and other science, which the scientists believe require more research. The major challenge is that these infections can get transmitted across HFs and various departments. There is a considerable gap in the endeavour to find a solution for the prevention of this problem. In addition, as mentioned in this article, the HFs layout has a critical role in controlling of NIs. The discovery of a solution in this field, specifically for the departments at high risk, will prove to be more beneficial and appropriate.

Conflict of Interest and Source of Funding: None.

Ethical Clearance: Not applicable.

REFERENCES


37. Padgaonkar AS. Modeling and analysis of the hospital facility layout problem: Faculty of New Jersey Institute of Technology; 2004.
Quality of Life Determination among Hemophiliac Children

Wameedh Hamid Shaker¹, Mohmmed Baqer Hassan¹, Ibrahim ALwan Kadhim Al-Ashour¹
¹University of Kufa / faculty of Nursing, Iraq

ABSTRACT

Objective: To identify the quality of life determination among hemophilic children at al -hakeem general hospital. To find out the relationship between hemophiliac children quality of life and their socio-demographic characteristic of age, gender, parents educational levels, family type and socio-economic status

Methodology: A descriptive study designed to find the quality of life among hemophilic children. The study was carried out the period from March 6th to April 4th 2016.

Conclusion: The result of this study indicated that the quality of live sample of male children with hemophilia was impaired, and that impairment according to the total Hemophilia –Quality of live score was greater among adolescents than children aged 8-12 years. Moreover, number of bleeding event, number of school absences, mother s’ education level, severity of hemophilia, insight to health status and insight to suffering from hemophilia were associated with hemophilia –Quality of live. In addition, family income and parent- administration of the product were the factors which predict the quality of live in children with hemophilia. Therefore, in order to improve Hemophilia –Quality of live adolescents, patients who were given drug infusion by third party care givers excluding parents and also patients with lower familial income are suggested to receive more effective interventions by authorities, managers and health care providers. For evidence based practice, further studies on Hemophilia –Quality of live in children are recommended.

Keywords: Quality of life, Determination, among, Hemophiliac, Children.

INTRODUCTION

Hemophilia is a group of genetic diseases characterized by reduced to obviously altered blood clotting resulting from a deficiency of one of the factors essential for blood coagulation, Hemophilia is an X-linked congenital bleeding disorder which occurs at a frequency of approximately 1 in every 10,000 births; it is caused by a deficiency in coagulation factor VIII hemophilia A, representing 80–85 % of the total number of diagnosed cases or factor IX hemophilia B, both of which are related to a mutation of the clotting factor gene. The number of affected persons worldwide is estimated to be about 400,000¹.

The life expectancy among people born with hemophilia who have access to currently available, adequate forms of treatment should approach normal. The rising life expectancy of men living with hemophilia is related to advances in bleeding prevention and hemostatic control, and the general consensus of experts in the field is that it is becoming increasingly practicable for hemophilia patients to lead more, for example, to participate in sports activities, have a professional career, and build a family².

Hemophilia is a rare, chronic, inherited disease primarily affecting males³. It is an X-linked bleeding disorder caused by a defective Factor VIII or Factor IX allele and leading to impaired clotting characterized by spontaneous bleeding and excessive bleeding after surgery or trauma. Many genetic illnesses exhibit a range of expressivity. Expressivity refers to the severity of the disease. Some children with hemophilia will exhibit mild expressivity. Among them, there are 3957 (61%) Factor VIII deficiency hemophilia A frequency of severe, moderate and mild hemophilia A was 47, 33 and 20%, respectively³.

Children with hemophilia may lose opportunities to achieve their potentialities during school and later in life.4 Individuals with severe hemophilia A Factor VIII level (≤1%) experience frequent bleedings, often into soft tissue and joints, leading to joint damage⁴.
According to individuals with hemophilia experience the impairment in quality of life and among children aged 8-16 years old the highest impairment was in the “physical health” subscale. It was also shown that the dimension of “physical health” was lowest in the subscale of quality of life in children and adolescents with hemophilia A.

Statement of problem:

Quality of Life among Hemophilic Children:

1. To identify the Quality of Life among Hemophilic Children At Al Hakeem General Hospital.

2. To find out the relationship between hemophilic children quality of life and their socio-demographic characteristic of age, gender, parents educational levels, family type and socio-economic status.

Design of the study: A descriptive study designed to find the Quality of Life among Hemophilic Children. The study was carried out the period from March 6th to April 4th 2016.

Setting of the study: The study was carried out in At Al Hakeem General Hospital in Al-najaf Al-Ashraf governorate.

The sample of the study: Collected sample of (40) patient of the Quality of Life among Hemophilic Children.

RESULTS

Table (1) The observed frequencies and percentages of patients’ groups according to socio-demographic data and clinical characterizations

<table>
<thead>
<tr>
<th>Groups</th>
<th>Frequency (total 40)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 ≤</td>
<td>22</td>
<td>55</td>
</tr>
<tr>
<td>≥ 12</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>36</td>
<td>90</td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>31</td>
<td>77.5</td>
</tr>
<tr>
<td>Rural</td>
<td>9</td>
<td>22.5</td>
</tr>
<tr>
<td>Educational Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Read &amp; Write</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>Primary School</td>
<td>24</td>
<td>60</td>
</tr>
<tr>
<td>Secondary School</td>
<td>13</td>
<td>32.5</td>
</tr>
<tr>
<td>Graduate</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Father Educational Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Read &amp; Write</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>Primary School</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Secondary School</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Graduate</td>
<td>13</td>
<td>32.5</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mother Educational Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Read &amp; Write</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>Primary School</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Secondary School</td>
<td>9</td>
<td>22.5</td>
</tr>
<tr>
<td>Graduate</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Cont. Table (1) The observed frequencies and percentages of patients’ groups according to socio-demographic data and clinical characterizations

<table>
<thead>
<tr>
<th>Socio-economic Status</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>13</td>
<td>32.5</td>
</tr>
<tr>
<td>Middle</td>
<td>19</td>
<td>47.5</td>
</tr>
<tr>
<td>Low</td>
<td>8</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Hemophilia</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>27</td>
<td>67.5</td>
</tr>
<tr>
<td>B</td>
<td>13</td>
<td>32.5</td>
</tr>
<tr>
<td>C</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intensity of the disease</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>Moderate</td>
<td>17</td>
<td>42.5</td>
</tr>
<tr>
<td>Severe</td>
<td>9</td>
<td>22.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suffering from bleeding</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>9</td>
<td>22.5</td>
</tr>
<tr>
<td>Moderate</td>
<td>23</td>
<td>57.5</td>
</tr>
<tr>
<td>Very severe</td>
<td>8</td>
<td>20</td>
</tr>
</tbody>
</table>

This table shows that most of the study sample (55%) are less than 12 years old, (90%) are males, (77.5%) are urban residents, (60%) are primary school graduated, (32.5%) of the study sample fathers levels of education is graduate, (27.5%) of the study sample mothers levels of education is able to read and write, and (47.5%) of the study sample present with a middle socio-economic status.

Above table shows that (67.5%) are patients suffering from type A of hemophilia, (42.5%) are present with moderate intensity of the disease, and, (57.5%) are suffering from moderate bleeding.

Table (2): Descriptive statistics of initial assessment for determination of quality of life for hemophilic children patients towards physical domain

<table>
<thead>
<tr>
<th>Physical domain</th>
<th>Groups</th>
<th>Freq.</th>
<th>Percentage (%)</th>
<th>M</th>
<th>SD</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty in Walking</td>
<td>Always</td>
<td>5</td>
<td>12.5</td>
<td>2.13</td>
<td>0.53</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>25</td>
<td><strong>62.5</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>10</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty in Running</td>
<td>Always</td>
<td>11</td>
<td>27.5</td>
<td>1.93</td>
<td>0.48</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>21</td>
<td><strong>52.5</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>8</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty in daily activity</td>
<td>Always</td>
<td>9</td>
<td>22.5</td>
<td>2.18</td>
<td>0.54</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>15</td>
<td>37.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>16</td>
<td><strong>40</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty in Lifting something</td>
<td>Always</td>
<td>16</td>
<td><strong>40</strong></td>
<td>1.88</td>
<td>0.47</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>13</td>
<td>32.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>11</td>
<td>27.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty in Taking a bath</td>
<td>Always</td>
<td>7</td>
<td>17.5</td>
<td>2.48</td>
<td>0.62</td>
<td>pass</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>7</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>26</td>
<td><strong>65</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty in Doing chores</td>
<td>Always</td>
<td>10</td>
<td>25</td>
<td>2.05</td>
<td>0.51</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>18</td>
<td><strong>45</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>12</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body pain</td>
<td>Always</td>
<td>10</td>
<td>25</td>
<td>1.98</td>
<td>0.49</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>21</td>
<td><strong>52.5</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>9</td>
<td>22.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This table shows assessment for determination of quality of life for hemophilic children patients towards physical domain. In relation to all of variable have failure assessment accept Difficulty in Taking a bath was pass assessment for determination of quality of life.

**Table (3): Descriptive Statistics of Initial Assessment For Determination of Quality of Life For Hemophilic Children Patients Towards Emotional Domain**

<table>
<thead>
<tr>
<th>Emotional domain</th>
<th>Groups</th>
<th>Freq.</th>
<th>Percentage (%)</th>
<th>M</th>
<th>SD</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being afraid</td>
<td>Always</td>
<td>14</td>
<td>35</td>
<td>1.88</td>
<td>0.47</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>17</td>
<td>42.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>9</td>
<td>22.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being sad</td>
<td>Always</td>
<td>7</td>
<td>17.5</td>
<td>2.15</td>
<td>0.54</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>20</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>13</td>
<td>32.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being angry</td>
<td>Always</td>
<td>12</td>
<td>30</td>
<td>2.05</td>
<td>0.51</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>14</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>14</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sleeping trouble</td>
<td>Always</td>
<td>6</td>
<td>15</td>
<td>2.35</td>
<td>0.59</td>
<td>pass</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>14</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>20</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being worried</td>
<td>Always</td>
<td>4</td>
<td>10</td>
<td>2.48</td>
<td>0.62</td>
<td>pass</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>13</td>
<td>32.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>23</td>
<td>57.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling depressed</td>
<td>Always</td>
<td>7</td>
<td>17.5</td>
<td>2.48</td>
<td>0.62</td>
<td>pass</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>7</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>26</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling despair</td>
<td>Always</td>
<td>7</td>
<td>17.5</td>
<td>2.50</td>
<td>0.63</td>
<td>pass</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>6</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>27</td>
<td>67.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of Confidence</td>
<td>Always</td>
<td>4</td>
<td>10</td>
<td>2.10</td>
<td>0.53</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>25</td>
<td>62.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>10</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This table shows assessment for determination of Quality of Life For Hemophilic Children Patients Towards Emotional Domain. In relation to all of variable have failure assessment accept sleeping trouble, Being worried, Feeling depressed and Feeling despair was pass assessment.

Table (4): Descriptive Statistics of Initial Assessment for Determination of Quality of Life for Hemophilic Children Patients towards Social Domain

<table>
<thead>
<tr>
<th>Social domain</th>
<th>Groups</th>
<th>Freq. (40)</th>
<th>Percentage (%)</th>
<th>M</th>
<th>SD</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other kids don’t support him</td>
<td>Always</td>
<td>13</td>
<td>85.7</td>
<td>2.13</td>
<td>0.53</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>9</td>
<td>8.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>18</td>
<td>5.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other kids refuse him</td>
<td>Always</td>
<td>2</td>
<td>84.3</td>
<td>2.50</td>
<td>0.63</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>16</td>
<td>11.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>22</td>
<td>4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teasing from other kids</td>
<td>Always</td>
<td>2</td>
<td>62.9</td>
<td>2.53</td>
<td>0.63</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>15</td>
<td>24.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>23</td>
<td>12.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can’t do things as others</td>
<td>Always</td>
<td>8</td>
<td>42.9</td>
<td>2.03</td>
<td>0.51</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>23</td>
<td>35.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>9</td>
<td>21.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keeping up when play</td>
<td>Always</td>
<td>12</td>
<td>65.7</td>
<td>1.90</td>
<td>0.48</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>20</td>
<td>22.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>8</td>
<td>11.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t going to the touristic journeys</td>
<td>Always</td>
<td>9</td>
<td>91.4</td>
<td>2.28</td>
<td>0.57</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>11</td>
<td>4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>20</td>
<td>4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not going to the gardens</td>
<td>Always</td>
<td>15</td>
<td>85.7</td>
<td>2.00</td>
<td>0.50</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>10</td>
<td>8.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>15</td>
<td>5.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not like the visitors</td>
<td>Always</td>
<td>7</td>
<td>80</td>
<td>2.45</td>
<td>0.61</td>
<td>pass</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>8</td>
<td>11.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>25</td>
<td>8.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t like to visit the relatives</td>
<td>Always</td>
<td>23</td>
<td>87.1</td>
<td>1.68</td>
<td>0.42</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>7</td>
<td>8.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>10</td>
<td>4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not Sharing conversations with my family members</td>
<td>Always</td>
<td>14</td>
<td>78.6</td>
<td>2.13</td>
<td>0.53</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>5</td>
<td>17.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>21</td>
<td>4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows Assessment For Determination of Quality of Life For Hemophilic Children Patients Towards Social Domain. In relation to all of variable have failure assessment accept Do not like the visitors was pass assessment.
### Table (5): Descriptive Statistics of Initial Assessment For Determination of Quality of Life For Hemophilic Children Patients Towards School Domain

<table>
<thead>
<tr>
<th>School domain</th>
<th>Groups</th>
<th>Freq.</th>
<th>Percentage (%)</th>
<th>M±SD</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay attention in class</td>
<td>Always</td>
<td>5</td>
<td>12.5</td>
<td>2.30</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>18</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>17</td>
<td>42.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forgetting things</td>
<td>Always</td>
<td>1</td>
<td>2.5</td>
<td>2.48</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>19</td>
<td>47.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>20</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School work</td>
<td>Always</td>
<td>5</td>
<td>12.5</td>
<td>2.18</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>23</td>
<td>57.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>12</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing school due to illness</td>
<td>Always</td>
<td>17</td>
<td>42.5</td>
<td>1.83</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>13</td>
<td>32.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>10</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing school to go to hospital</td>
<td>Always</td>
<td>19</td>
<td>47.5</td>
<td>1.70</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>14</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>7</td>
<td>17.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in activity due to sudden bleeding</td>
<td>Always</td>
<td>11</td>
<td>27.5</td>
<td>1.85</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>24</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>5</td>
<td>12.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing school due to joint pain</td>
<td>Always</td>
<td>18</td>
<td>45</td>
<td>1.58</td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>21</td>
<td>52.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>1</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty in sitting on sharp-edged seats</td>
<td>Always</td>
<td>22</td>
<td>55</td>
<td>1.48</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>17</td>
<td>42.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>1</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prevented from sport to avoid bleeding</td>
<td>Always</td>
<td>30</td>
<td>75</td>
<td>1.38</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>5</td>
<td>12.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>5</td>
<td>12.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows Assessment For Determination of Quality of Life For Hemophilic Children Patients Towards School Domain. In relation to all of the variable, the failure assessment accepts Forgetting things was pass assessment.

### Table (6): Association Between Demographical Characteristics and Overall Assessments Due To Quality of Life Towards Hemophilic Children Patients (Under/Upper) Cutoff Point

<table>
<thead>
<tr>
<th>Demographical Characteristics &amp; Overall assessments due to quality of life</th>
<th>Contingency Coefficient</th>
<th>P-value</th>
<th>C.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Groups</td>
<td>0.233</td>
<td>0.413</td>
<td>NS</td>
</tr>
<tr>
<td>Gender</td>
<td>0.087</td>
<td>0.683</td>
<td>NS</td>
</tr>
<tr>
<td>Residence</td>
<td>0.045</td>
<td>0.740</td>
<td>NS</td>
</tr>
<tr>
<td>Father education Level</td>
<td>0.019</td>
<td>0.872</td>
<td>NS</td>
</tr>
<tr>
<td>Mother education Level</td>
<td><strong>0.034</strong></td>
<td><strong>0.044</strong></td>
<td>S</td>
</tr>
<tr>
<td>Socio-Economic Status</td>
<td>0.209</td>
<td>0.074</td>
<td>NS</td>
</tr>
</tbody>
</table>
Non-Significant at P<0.05

This table show significant correlation between Quality of Life Towards Hemophilic Children and Mother education Level at p-value (0.044). Other variables have no significant correlation between Demographical Characteristics and Assessments Due To Quality of Life Towards Hemophilic Children Patients. In relation to Age Groups, Gender, Residence, Father education Level and Socio-Economic Status at p-value (0.413, 0.683, 0.740, 0.872,and 0.074) respectively.

This chapter present a systemically organized interpretation and reasonably derived Discussion of results the support of available literatures and related studies.

**DISCUSSION**

Determination of the quality of life of children and adolescents with hemophilia is an important part in the holistic management of this chronic disease, and this is attainable through the use of disease - related Quality of live questionnaires. Hemophilia is an X-linked congenital bleeding disorder caused by a deficiency of coagulation factor VIII (FVIII) (in hemophilia A) or factor IX (FIX) (in hemophilia B). The deficiency is the result of mutations of the respective clotting factor genes. Hemophilia has an estimated frequency of approximately one in 10,000 births.

Throughout the course of the present study, as shown in table (1) which refers to the statistically distribution of the observed frequencies, percentages of some related demographical characteristics variables for all the studied sample. Regarding to the gender, the findings indicate that gender (90%) are males. Regarding to the Residence (77.5%) are urban residents. Regarding to the father and mother education level the study findings show that almost one third of the study sample their father Graduated and mother are Read & Write (32.5%), (27.5%) respectively. Regarding to the socioeconomic status, it was found that most of the study sample are from middle level of SES.

Table (2) Shows that the study findings represent that (67.5%) are patients suffering from type A of hemophilia, (42.5%) are present with moderate intensity of the disease, and, (57.5%) are suffering from moderate bleeding. The association between the severity of hemophilia and quality of live in our study was consistent with other studies. Poon et al. was demonstrated that individuals with more severe hemophilia and higher self-reported joint pain and motion limitation had poorer HR quality of live scores, particularly in the physical aspects of HR quality of live.

It was also revealed that the patients with various severities of hemophilia showed different impairments in their HR Quality of live. Severely affected patients were more impaired in their ‘physical functioning’ than moderate or mild patients. The severity of the disease may influence joint movement, physical activity, treatment and relationships with others, and these factors might negatively impact the quality of live.

**CONCLUSION**

The result of this study indicated that the quality of live sample of male children with hemophilia was impaired, and that impairment according to the total Hemophilia –Quality of live score was greater among adolescents than children aged 8-12 years. Moreover, number of bleeding event, number of school absences, mother s’ education level, severity of hemophilia, insight to health status and insight to suffering from hemophilia were associated with hemophilia –Quality of live. In addition, family income and parent- administration of the product were the factors which predict the quality of live in children with hemophilia.

**Declaration of Interest:** Nil.

**Source of Funding:** Self.

**Ethical Clearance:** After the approval of protocol by the Ethical Review Board, university of kufa/Iraq and before enrollment, all subjects gave their written informed consent.

**REFERENCES**


2. Cömert M, Güneş AE, Sahin F, Saydam G. Quality


Sensitivity and Specificity of Linear Gingival Erythema as Immune Suppression Marker in Pediatric HIV-infected at UPIPI Soetomo General Hospital Surabaya, Indonesia

Mario Powa Mensana¹, Alexander Patera Nugraha², Diah Savitri Ernawati³, Bagus Soebadi³, Erwin Asta Triyono⁴, Dominicus Husada⁵, Remita Adya Prasetyo⁶

¹Undergraduate Student, Faculty of Dental Medicine, ²Doctoral Student of Medical Science, Faculty of Medicine, ³Department of Oral Medicine, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia, ⁴Department of Internal Medicine, ⁵Department of Child Health, Faculty of Medicine, Universitas Airlangga, Intermediate Care and Infectious Disease Centre, Dr. Soetomo Hospital, Surabaya, Indonesia, ⁶Division of Oral Medicine, Dental and Oral Health Unit Dr. Soetomo Hospital, Surabaya, Indonesia

ABSTRACT

Introduction: Strikingly, more than 95% pediatric HIV infections worldwide are in developing countries. Although ART can reduce significantly the risk of HIV transmission to children born from HIV-infected mothers, this can be effective only if the women know their HIV status. In many developing countries, such as Indonesia, the lack of access by pregnant mothers to laboratory facilities may deprive them of knowing their HIV status, thus the opportunity to transmit the disease to their children is high, knowing no preventive intervention is attempted. To date, it is estimated that the number of HIV infected children in Indonesia who are left undiagnosed is still high, therefore a study on clinical markers of HIV that can aid in the diagnosis and predict the severity of the disease among children is critical. In this study, Linear Gingival Erythema is assessed on its correlation to degree of immune suppression to be used as HIV clinical marker in laboratory-poor settings in Indonesia.

Method: HIV-infected children admitted to Soetomo General Hospital between June – October 2017 were screened and examined intraorally for the presence of LGE. Other relevant data were obtained from questionnaire-guided interview to parents/guardians and from patient’s medical record.

Results: LGE was found in 21.43% children and statistical analysis shows significant correlation of LGE to degree of immune suppression.

Conclusion: Further study with larger study population size is required to analyze the sensitivity and specificity of LGE to be used as HIV marker in predicting a particular degree of immune suppression, specific to Indonesian pediatric population.

Keywords: Oral Manifestation, Children with HIV/AIDS, Linear Gingival Erythema, CD4+

INTRODUCTION

Human Immunodeficiency Virus (HIV) continues to be a major global health issue. United Nations Program on HIV/AIDS (UNAIDS) estimated 36.7 million people worldwide were living with the infection in 2016, with an extremely high proportion (95%) resides in developing countries. Despite the discovery of ART decades ago, the growth rate of HIV-infected population is still unacceptably high; 5,000 new infections per day, which 400 among them are children below 15 years.¹²

Most (90%) children were infected with HIV through mother to-child transmission (MTCT).³ Although the administration of ART during pregnancy and other preventive interventions can significantly lower the risk of MTCT from 45% to less than 2%, this is not the case for many developing countries, such as Indonesia.⁴

Corresponding author:
Diah Savitri Ernawati
Departement of Oral Medicine, Faculty of Dental Medicine, Universitas Airlangga, Jl. Mayjen Prof. Dr. Moestopo 47 Surabaya, Indonesia 60132.
Telp: +62315030255. Fax: +62315020256.
E-mail: diah-s-e@fkg.unair.ac.id.

Indonesia does not screen for HIV infection as part of its routine antenatal care due to laboratory limitations in many areas. This concerning condition causes many children born from unaware women of their HIV status do not get the necessary preventive interventions from the outset, thus they are very vulnerable to get vertically infected. This is proven by the drastic increase of reported new HIV infections among Indonesian children below 4 years between 2010-2015 by >230%.  

To date, it is estimated that the number of HIV infected children who are left undiagnosed in Indonesia is still high. When no laboratory facilities are available, clinical indicators becomes the solely most important marker in making presumptive diagnosis of HIV infection and predict the severity of the disease. Oral manifestations have longed been studied to be used as HIV clinical indicators, however no studies to date have analyzed the correlation of these oral lesions to predict certain degree of immune suppression among Indonesian pediatric population. One of the most commonly found oral lesions in HIV pediatric infection is Linear Gingival Erythema (LGE). The aim of this study is therefore to analyze the correlation of LGE to degree of immune suppression among pediatric patients admitted to Intermediate Care and Infectious Disease Centre (UPIPI), Soetomo General Hospital, Surabaya, Indonesia.

**MATERIAL AND METHOD**

A cross-sectional study was carried between June – October 2017 at the outpatient clinic UPIPI, Soetomo General Hospital. The study protocol was approved by Ethics Committee of Dr. Soetomo Hospital (No:326/Panke.KKE/V/2017) and Health Research Ethical Clearance Commission Universitas Airlangga (No:137/HREC.C.FODM/VIII/2017). Pediatric patients under 18 years with confirmed HIV diagnosis according to the Indonesian Ministry of Health guidelines and attended the center between the study period were screened. The age limit set for pediatric patients in this study follows the regulations applied by the Indonesian legal system.

Prior to the study, attending parents/guardians of the eligible patients were explained about the study objectives. Approval from parents/guardians regarding the participation of their children in the study was obtained by written consents. Oral mucosal status of each patient was then assessed by a trained oral medicine specialist using disposable plastic mouth mirrors and sterile gauze pads under artificial lighting. Identification of LGE was based on its clinical features according to EC-Clearinghouse diagnostic criteria as a distinct fiery red band along the margin of the free gingiva, with the amount of erythema is disproportionately intense for the amount of plaque seen.

Other relevant data of the patients were obtained from their respective parents/guardians through questionnaire-guided interview and from their medical records. Data collected include age, gender, use of ART, and latest laboratory result on CD4 values (CD4% or CD4 counts). Viral load counts were not accessible to most patients; thus, this parameter was excluded from the present study. To determine patients’ immune status closest to the condition at oral examination, CD4 values were restricted only up to 6 months interval from the date of examination. This time range follows the Indonesian Ministry of Health guidelines on pediatric CD4 monitoring. CD4 value of each patient served as a baseline to determine patient’s degree of immune suppression according to classification system of Centers for Disease Control (CDC) (Table 1).

Correlation between LGE and degree of immune suppression was analyzed using chi-square test. Statistical Package of Social Sciences (SPSS) 17.0 for windows was used and p values <0.05 were considered significant.

**RESULTS**

The study was conducted among HIV-positive children admitted to the outpatient clinic at UPIPI, Soetomo General Hospital, Indonesia. Between June – October 2017, a total of 47 HIV-positive children who attended the center were screened. This number is much lower than the total number of children registered at the center. Although all HIV-positive children are required to pay periodic visit to the center for monitoring, the reality did not seem so. Many parents/guardians did not attend the center with their children, unless their children show any symptoms. Far distance between the center and their homes and the fact that their children need to attend classes at schools were the most-heard reasons from parents/guardians who came to the center to get the prescribed ART for free on behalf of their children.
Out of the 47 children screened, a relatively high proportion (19 children) had to be further excluded. Reasons for exclusion were parental refusal in providing consents, children being not cooperative during examination, and no CD4 values found within 6 months interval from the date of oral examination on patients’ medical record. Not all children were routinely get their CD4 tested due to the high laboratory cost. Consequently, the total number of children included in the study is 28 children.

Summary of age range, ART status, and degree of immune suppression of these children are presented in Table 2. Oral examinations on 28 Indonesian children found LGE in 6 (21.43%) children (Fig 1 & 2). Three (10.71%) children with LGE were on ART while the other 3 (10.71%) were ART naïve (Table 2).

Indonesian children were categorized into several degrees of immune suppression. Two (7.14%) children with LGE were in degree of no immune suppression, while the other 4 (14.29%) children with LGE were in degree of severe immune suppression (Table 2). Statistical analysis to correlate the occurrence of OHL according to child’s immune suppression was found to be statistically significant (p value = 0.027) (Table 3).

Table 1. Immunologic categories based on age-specific CD4 % and CD4 counts.

<table>
<thead>
<tr>
<th>Immunologic category</th>
<th>Age of child</th>
<th>&lt; 12 months</th>
<th>1-5 years</th>
<th>&gt; 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cells/mm³</td>
<td>%</td>
<td>cells/mm³</td>
<td>%</td>
</tr>
<tr>
<td>No immune suppression</td>
<td>≥ 1,500</td>
<td>≥ 25</td>
<td>≥ 1,000</td>
<td>≥ 25</td>
</tr>
<tr>
<td>Moderate immune suppression</td>
<td>750 - 1,499</td>
<td>15 - 24</td>
<td>500 - 999</td>
<td>15 – 24</td>
</tr>
<tr>
<td>Severe immune suppression</td>
<td>&lt; 750</td>
<td>&lt; 15</td>
<td>&lt; 500</td>
<td>&lt; 15</td>
</tr>
</tbody>
</table>

Table 2. Summary of age, ART status, and degree of immune suppression in the study population

<table>
<thead>
<tr>
<th>No. of Patients</th>
<th>OHL present</th>
<th>OHL absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>6 (21.43%)</td>
<td>22 (78.57%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>No immune suppression</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age range (years)</td>
<td>1 - 15</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mean age</td>
<td>6.8 ± 3.1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HAART</th>
<th>OHL present</th>
<th>OHL absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>3 (10.71%)</td>
<td>21 (75%)</td>
</tr>
<tr>
<td>No</td>
<td>3 (10.71%)</td>
<td>1 (3.57%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree of immune suppression</th>
<th>No immune suppression</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>2 (7.14%)</td>
<td>16 (57.14%)</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>-</td>
<td>3 (10.71%)</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>4 (14.29%)</td>
<td>3 (10.71%)</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Statistical relationship between LGE and immune suppression degree in the study population

<table>
<thead>
<tr>
<th>No. of Patients</th>
<th>Chi-square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of Immune Suppression</td>
<td>LGE present</td>
<td>LGE absent</td>
</tr>
<tr>
<td>No</td>
<td>2 (7.14%)</td>
<td>16 (57.14%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>-</td>
<td>3 (10.71%)</td>
</tr>
<tr>
<td>Severe</td>
<td>4 (14.29%)</td>
<td>3 (10.71%)</td>
</tr>
</tbody>
</table>

*statistically significant
DISCUSSION

Oral lesions can not only indicate HIV infection, they are also among the earliest clinical features of the infection that can aid in predicting the course of the disease. EC-Clearinghouse clinical diagnostic criteria, the term of reference for most studies in HIV-associated oral diseases, classified LGE into lesions commonly associated with pediatric HIV infection. LGE was formerly known as HIV-gingivitis and it is the most common form of HIV-associated periodontal disease in infected children.14

LGE has been correlated to fungal infection of the Candida species, yet the nature etiology of this lesion is still a controversy, as other studies reported different findings.15 Umadevi et al reported the possibility of certain viruses, such as CMV, EBV, and papillomavirus in initiating and causing LGE progression.16 On the contrary, Aas et al. found Saccharomyces cerevisiae, Gamella spp., Dialister spp., Streptococcus spp., and Veillonella spp. as the causative agents of LGE.17 Despite the discrepancies between studies, it is now widely accepted that Candida contributes to the occurrence of LGE as many clinical cases were effectively treated with antifungal treatment.15,18

In this study, the prevalence of LGE was found to be 21.43%. This prevalence is higher than other studies in developing countries in Uganda (0.84%) 19 and India (2.27% 20 and 9.05%21) yet lower than a study conducted in Venezuela (27.03%)22. The varying prevalence of LGE between countries may be due to the distinct characteristics among the populations (proportion of the population on ART, their adherence to ART, immune status of the population, nutritional status, etc.), as well as the influence of cultural and geographical factors of each country.

Furthermore, EC-Clearinghouse classification has also associated LGE to be more prevalent in children HIV infection than in adults.18 Comparing this study to another study conducted in 2014 among adult patients at the same centre (UPIPI, Soetomo General Hospital) supports this classification as LGE was found to be much lower in adult patients (5.83%) than among pediatric children in this study.23

ART has been widely accepted to be highly effective at inhibiting HIV replication, although it is not curative. Combination of ART can dramatically suppress the number of virus circulating in the plasma, even to a level of undetectable. With the successful viral suppression, immunologic recovery is expected and the number of opportunistic infections to manifest should be lower.24 In this study, although LGE were also found in children undergoing ART, LGE were found more predominantly in children who had not received treatment as seen in Table 2.

Although LGE in this study were found in children with severe immune suppression yet also in children with no immune suppression, the occurrence of LGE is more notable in children with severe immune suppression (4 children with LGE among 7 children with severe immune suppression) than in children with no immune suppression (2 children with LGE among 18 children with no immune suppression). This trend indicates that LGE will be more likely to manifest when immune status of the host is continuously declining. Statistical analysis between the presence of LGE with degree of immune suppression is also proven to have a solid relationship (p value = 0.027) (Table 3).

CONCLUSION

Immune status was significantly correlated with the presence of LGE in this study. However, its sensitivities and specificities to predict a specific degree of immune suppression is yet still need to be assessed. Further study with larger Indonesian pediatric HIV/AIDS population size is thus recommended.

Conflict of Interest: The authors declare no conflict of interest.

Sources of Funding: This research is self-funded.

REFERENCES


Maternal Mortality with Panel Regression Approach Model based on Maternal and Child Health Revolution Program or ETC Performance Indicators at Nusa Tenggara Timur Province Indonesia

Yuanita Clara Rogaleli 1,2, Irfan2, Kuntoro3
1 Doctoral Student, Program of Public Health, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia, 2 Lecturer, Health Polytechnic of Kupang, Nusa Tenggara Timur, Indonesia, 3 Professor of Biostatistics, Department of Biostatistic and Demographic, Faculty of Public Health, Airlangga University, Surabaya, Indonesia

ABSTRACT

Nusa Tenggara Timur (NTT) government had launched a local specific program, namely Maternal and Child Health Revolution Program (MCHRP) or Revolusi KIA at 2009. However, maternal mortality still becomes one of the biggest public health problems in NTT Province in Indonesia.

The slow decreasing of Maternal Mortality Ratio (MMR) need a study in order to determine MCHRP performance indicators that have the biggest influence in decreasing maternal mortality ratio at each district of NTT Province at a specific range of time in order to develop a more effective, efficient and directed plan or policy for maternal and child health intervention program.

The aim of this research is to identify and analysis factors that influence the maternal mortality ratio of 2011 – 2015 based on MCHRP performance indicators at every district and municipality of NTT Province.

This applied research used data from MCHRP indicators program reports from 2011 to 2015 at Public Health Division of NTT Health Office with 22 districts and municipalities as unit analysis. The data analyzed using panel data regression.

Result from this analysis shows that the trend of performance indicator achievements tends to fluctuate and imbalanced for every district and municipality. The best Panel Data Regression Model that can be used for evaluating the achievement of MCHRP performance indicators toward MMR at NTT is the Random Effect Model that takes into account the place and time effect error. Indicators that have significantly influenced in decreasing MMR at NTT are the complete Ante Natal Care (ANC) visit, childbirth assisted by a skilled health professional with midwifery competence, complete postpartum care (PNC) visit and complication care with determination coefficient ($R^2$) 90%.

Keywords: Maternal Mortality Ratio (MMR), Maternal and Child Health Revolution Program, Panel Data Regression

INTRODUCTION

Indonesia is one of developing countries that did not reach MDG’s target in decreasing MMR to 102/100,000 live birth in 2015(1). Based on data from Demographic and Health Survey (DHS) there was a significant increasing of MMR in Indonesia from 228/100,000 live births in...
2007 to 359/100,000 live births in 2012. Furthermore, based on Between Sensus Population Survey in 2015 the MMR in Indonesia is 305/100,000 live births, which is still far from the MDG’s target.

Since 2009, NTT as one of the provinces in Indonesia that has a highest MMR has been trying to accelerate the decreasing of maternal and child morbidities and mortalities with a tremendous program called Maternal and Child Health Revolution Program (MCHRP) or Revolusi KIA.

This program runs through a regulation that all childbirth must be assisted by skilled health professional with midwifery competence at adequate health care facility for 24 hours\(^{(3)}\). This regulation has an impact on the increased numbers of health care facilities and health care facilities with basic obstetric and neonatal emergency care at NTT from 292 sub district health center or puskesmas with 61 puskesmas equipped by basic obstetric and neonatal emergency care (20.89%) in 2009 to 374 puskesmas with 374 puskesmas equipped by basic obstetric and neonatal emergency care (62.57%).

However, this MCHRP seems to be not yet effective in reducing the MMR at NTT. The annual reduction of MMR tends to slowly decrease which is 220/100,000 live birth in 2011, 200/100,000 live birth in 2012, 185.6/100,000 live birth in 2013, 169/100,000 live birth in 2014 and 133/100,000 live birth in 2015. The low achievements of MCHRP performance indicators which are complete ANC visit coverage is 61.63%, childbirth assisted by skilled health professional with midwifery competence coverage is 69.97% and childbirth at health care facilities coverage is 69.95%\(^{(4)}\). These facts showed that there are still 34% childbirth delivered at home and around 30% childbirth still assisted by traditional birth attendance that put the maternal at risk. When obstetric complication on childbirth happened it can be lead to maternal and child dead if handling late that can be caused by late referee caused by geographic, social cultural or economic factors\(^{(5)(6)}\).

There are some challenges and obstacles in the process of reducing MMR at NTT such as the insufficient knowledge and awareness from the community toward the importance of maintaining health and safety of pregnant women; insufficient nutrition status and health of pregnant women; limited access of pregnant women to qualified health care facilities and comprehensive obstetric care caused by geographic and topographic factors (archipelago, highland and hill) and the patriarchy culture; insufficient numbers of health care facilities and insufficient of health professionals (quantity, quality and distribution)\(^{(7)(8)}\).

Thus to make the initiatives in reducing MMR program at NTT succeed, it is important to define the achievement indicators of MCHRP that have the biggest effect in reducing MMR at every district and municipality at NTT at a specific period of time in order to develop a more effective, efficient and directed plan or policy for maternal and child health intervention program.

The aim of this research is to identify and analysis factors that influence the maternal mortality ratio of 2011 – 2015 based on performance indicators of MCHRP at each district and municipality of NTT Province.

**MATERIAL AND METHOD**

This applied research used data from MCHRP indicators program reports from 2011 to 2015 at Public Health Division of NTT Health Office with 22 districts and municipalities as unit analysis. The data analyzed using panel data regression because it takes into account the weighting of individual effect (district/municipality) and time period (2011 – 2015).

Analyzed variables in this research are the response variables, i.e. MMR, predictor variables, i.e. ANC 1st coverage, 4 times ANC coverage, childbirth assisted by skilled health professionals with midwifery competent coverage, 3 times PNC visits, complication care coverage and the number of puskesmas equipped by basic obstetric neonatal emergency care at every district and municipality.

Panel Regression Model analyzed by eviews7 software consists of three models which are the common effect model, the fixed effect model and the random effect model.

The best regression model was selected by using Chow test and Hausman test. Chow test is used to choose between the common effect model and the fixed effect model. If the null hypothesis accepted, then the common effect model chose, whereas Hausman test used to choose between the fixed effect model and the random effect model. If the null hypothesis accepted, then random effect model chose. The best regression model was selected by using both tests.
model will use to estimate the panel data.

**FINDINGS**

Table 1 shows that MMR average and the achievements of MCHR P performance indicators tend to fluctuate and imbalance at every district and municipality in NTT Province, which are shown from standard deviation and the big difference of minimum and maximum at every research variable. MMR average from 2011 to 2015 is 181.5/100.000 live birth.

There is a significant difference between every district and municipality with range between 107.40/100.000 live births to 219.8/100.000 live birth. PNC visit indicator and complication care indicator coverage also showed a big significant difference between every district and municipality in the 5 years time period.

**Table 1: Description of research variables of NTT Province 2011 – 2015**

<table>
<thead>
<tr>
<th>Indicator/Research Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMR</td>
<td>181.50</td>
<td>32.96</td>
<td>107.40</td>
<td>219.8</td>
</tr>
<tr>
<td>ANC (1st visit) coverage</td>
<td>86.00</td>
<td>11.82</td>
<td>38.9</td>
<td>127.5</td>
</tr>
<tr>
<td>Complete ANC (minimum 4 times visit) coverage</td>
<td>61.80</td>
<td>14.41</td>
<td>30.7</td>
<td>92.1</td>
</tr>
<tr>
<td>Skilled health professional with midwifery competence birth delivery assisted coverage</td>
<td>74.00</td>
<td>5.30</td>
<td>69.10</td>
<td>76.60</td>
</tr>
<tr>
<td>PNC (minimum 3 times visit)</td>
<td>77.10</td>
<td>18.4</td>
<td>11.3</td>
<td>102.6</td>
</tr>
<tr>
<td>Complication care coverage</td>
<td>52.00</td>
<td>26.00</td>
<td>6.9</td>
<td>117.4</td>
</tr>
<tr>
<td>Puskesmas equipped by obstetric and neonatal emergency care coverage at every district/municipality</td>
<td>5.00</td>
<td>3.00</td>
<td>2.00</td>
<td>16.00</td>
</tr>
</tbody>
</table>

The data panel regression analysis benefit to look for MMR difference at every district and municipality in the time period. Every indicator very depended by the difference of time (year) and place (district/municipality).

The test result of the best panel data regression can be seen in table 2. The result from Chow test shown p value = 0.000 meaning that the common effect model rejected. Whereas the result from Hausman test show p value = 0.138 meaning that the random effect model accepted that can be used further to estimate performance indicator of MCHR P toward MMR at every district and municipality NTT in 2011 – 2015 time period. Random effect model resulting from the analysis for MMR estimation at NTT province has taken into account the heterogeneity of unobservable place and time variables and reduce the collinearity between predictor that resulted a more efficient estimation (9).

**Table 2: The best panel regression model test result**

<table>
<thead>
<tr>
<th>Test</th>
<th>Statistic value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chow Test</td>
<td>F = 5.1631</td>
<td>0.000</td>
</tr>
<tr>
<td>Hausman Test</td>
<td>$X^2 = 2199$</td>
<td>0.138</td>
</tr>
</tbody>
</table>

Based on the result on table 3 performance indicators of MCHR P that significantly influence the MMR in NTT are ANC visit, childbirth assisted by skilled health professionals with midwifery competence, PNC visit and complication care. The indicator that has the biggest influence in reducing MMR in NTT Province is the complete ANC visit.

Every regression coefficient in the Random Effect Model that has negative value means that if we increase the four indicators mention above then the MMR will decrease, vice versa.

The $R^2_{adjusted}$ values of this model is 0.9008 which is included in the very good category that mean about 90.08% change in MMR can be explained by these four predictor variables in the model.

Regression coefficient of the complete ANC visit i.e. -0.4814 mean that if the complete ANC visit increase 10%, then the MMR will have a chance to decrease at about of 4/100,000 live births annually both for the district and municipal level estimation and province level estimation. The interpretation of coefficient regression of other variables in the model can be done similarly.
**Table 3 Results from Random Effect Model Analyze**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-statistic</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constanta (C)</td>
<td>6.6354</td>
<td>2.2724</td>
<td>2.9199</td>
<td>0.0043</td>
</tr>
<tr>
<td>Complete ANC (minimum 4 times visits) coverage</td>
<td>-0.4814</td>
<td>0.1808</td>
<td>-2.6626</td>
<td>0.0205</td>
</tr>
<tr>
<td>Childbirth delivery assisted by a skilled health professional coverage</td>
<td>-0.0952</td>
<td>0.0436</td>
<td>-2.2319</td>
<td>0.0267</td>
</tr>
<tr>
<td>PNC (minimum 3 times visits) coverage</td>
<td>-0.0950</td>
<td>0.0418</td>
<td>-2.3167</td>
<td>0.0258</td>
</tr>
<tr>
<td>Complication care coverage</td>
<td>-0.0942</td>
<td>0.0367</td>
<td>-2.4810</td>
<td>0.0238</td>
</tr>
</tbody>
</table>

The best model specification

<table>
<thead>
<tr>
<th>R²</th>
<th>0.9276</th>
<th>F statistic</th>
<th>123.6292</th>
</tr>
</thead>
<tbody>
<tr>
<td>R²Adjusted</td>
<td>0.9008</td>
<td>p value</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The result of this research shows that the MCHRP performance indicator that has the biggest contribution in decreasing MMR at every district and municipality in NTT on 2011 – 2015 time period is the complete ANC visit or a minimum 4 times ANC visits indicator. Increasing 10% complete ANC visit coverage will have a chance to decrease MMR in the amount of 4/100,000 live birth.

Hence this indicator needs to get more attention in order to prevent complication and maternal and child mortality. ANC visit related with maternal behavior in health caring and access to health care facilities.

In the reality, many community members at NTT still consider that the pregnancy is a usual and natural stage of life that lead pregnant women not regularly visit health professional.

These beliefs have an implication of the high numbers of un-detection of maternal with high risk factors. These un-threaten maternal high risk factors lead to the delay on getting care that can cause a serious health consequences such as hospitalization or even death both for the mother or the baby. Even though around 80% of maternal mortality are preventable if they regularly visit health professional for ANC. ANC visits is important in order to early detection and on time care for threaten the complication at pregnancy, labor and post partum which can help in reducing MMR.

This research also found that the average of ANC visit at NTT Province at 2001 – 2015 period was 61.80%.

The utility of the ANC at health facilities influenced by the low of women’s autonomy in economic (freedom to regulate their family budget allocation), low freedom on mobility and low authority in decision making which can be caused by maternal status in their family and community. The other factors that can influence ANC visits are the attitude of pregnant women themselves of the importance of their health care especially antenatal care. Supports from family members and community leaders and also information and assistance from heath professionals toward ANC visits can increase maternal intention.

This research also found that the average of ANC visit at NTT Province at 2001 – 2015 period was 61.80%.

The Prenatal class or Kelas Ibu Hamil can become a medium for increasing women’s autonomy with target and material modification. The Prenatal class that used to target the pregnant women can also make the husband and childbearing age couples as target to prepare them for their pregnancies later. The materials that can be added in the Prenatal class, such as the rule of women in fulfill the reproduction’s health right and the need for...
reproductive health at every cycle. Hopefully with the increasing knowledge of the pregnant mother and the husband about the reproduction’s health will benefit from increasing the complete ANC visit coverage, childbirth assisted by skilled health professionals with midwifery competence coverage and PNC visit coverage.

Besides that, the network that already exists between health professionals with the traditional birth attendance must be more developed in order to make a safe pregnancy, clean and safe childbirth and postpartum by reducing negative myths regarding pregnancy, childbirth and postpartum but still keep culture values that exist in the community in order to reduce MMR and Child Mortality Ratio. This is also important because many pregnant women still choose the traditional birth attendant assist in childbirth, reasoned by their personal reasons such as more familiar, understand and can help with traditional childbirth ritual and also because the traditional birth attendant can assist the maternal and the child up to 40 days after delivery.

CONCLUSIONS

In order to decrease MMR at NTT through the MCHRP, the performance indicators that have the biggest influence are increase the complete ANC visit coverage, the complete PNC visit coverage and childbirth assisted by skilled health professionals with midwifery competence coverage and PNC care visit coverage, respectively, which can increase by target and material modification in Prenatal Class and also by strengthening the network between health professional and traditional birth attendance.

Conflict of Interest: There is no conflict of interest for every author.

Source of Funding: This research funded by Compete Research Grant from Health Polytechnic of Kupang, Nusa Tenggara Timur, Indonesia

Ethical Clearance: There are no human participants involved in this research. However the procedure of this research had already gotten ethical approval of Health Research Ethics Committee, Faculty of Public Health Airlangga University.

Informed Consent: This research used secondary data. No informed consent needed.

REFERENCES


Role of microRNA-423 Gene Variation in Women at Higher Risk of Breast Cancer in Tabuk of Saudi Arabia

Rashid Mir¹, Ibrahim Abdullah Al Balawi², FM Abu-Duhier¹
¹Department of Medical Laboratory Technology, Faculty of Applied Medical Sciences, Prince Fahd Bin Sultan Research Chair, University of Tabuk, Kingdom of Saudi Arabia, ²Department of Surgical Oncology, Faculty of Medicine, University of Tabuk

ABSTRACT

Aim: Background- MicroRNA has attracted increasing attention due to their possible involvement in the development of various types of cancer. Many studies have been conducted to investigate the association between miR-423 rs6505162C/T and Breast cancer risk; however, the results are not consistent. Therefore, we investigated the association of microRNA-423 rs6505162C>A gene variations with Breast cancer cases, sex match healthy controls and Women at higher risk of breast cancer susceptibility in Saudi women.

Methodology: This study was conducted on 90 subjects among whom 30 were Women at higher risk of breast cancer (WHR), 30 were Breast cancer cases and 30 were gender matched healthy controls. The microRNA-423 rs6505162C>A gene variations was performed using Amplification refractory mutation system PCR method.

Results: A significant difference was observed in genotype distribution between women at higher risk of breast cancer and Breast cancer cases (P=0.04) and between sex match healthy controls and Women at higher risk of breast cancer (P=0.009). The frequencies of all three genotypes CC, CT, TT reported in the women at higher risk of breast cancer were 20%, 43% and 37%, Breast cancer patients 53%, 37% and 10% and in sex matched healthy controls 57%, 30% and 13% respectively. Our results indicated that the miR-423-rs6505162C>T gene variant is associated with an increased risk of Women at higher risk of breast cancer in Codominant inheritance model (OR=0.20, 95% CI=(0.05-0.80) p=0.020, TT vs CC; Dominant model (OR=0.26, 95% CI= (0.86-0.81), p=0.020, CT+TT vs CC) and no significance was reported in Recessive model (OR=0.38, 95%CI= (0.12-1.21), P=0.07, TT vs CC+CT) inheritance models tested. While, the T allele significantly increased the risk in Women at higher risk of breast cancer (OR= 0.38; 95% CI= (0.18-0.78); p=0.009 compared to C allele.

Conclusion: Our findings indicated that microRNA-423 TT genotype and T allele are associated with an increased susceptibility to Breast cancer in high risk women. Furthers studies with larger sample sizes are necessary to confirm our findings.

Keywords : Women at higher risk of breast cancer, MicroRNA, SNP-single nucleotide polymorphism,

INTRODUCTION

Breast cancer is the second most commonly diagnosed cancer worldwide (1). Breast cancer (BC) has a major impact on health of women worldwide and the Kingdom of Saudi Arabia (KSA) is no exception. It is considered the most common malignancy and embodies the second leading cause of cancer deaths after lung
cancer. The malignancy carries tremendous socioeconomic, emotional, and public health implications. It is estimated that more than one million new cases of BC are diagnosed annually. Breast cancer incidence rates in Arab women have increased during the last 24 years, but women are still being diagnosed with BC at more advanced stages of the disease (2,3). An estimated 5-10% of all breast cancer cases are thought to be hereditary or caused by known genetic factors. A mutation in the BRCA1 or BRCA2 gene is one of the main known causes of hereditary breast cancer. MicroRNAs are a class of small, endogenous, non-coding, single-stranded, highly conserved and tissue-specific RNA molecules which take part in the regulation of target mRNAs expression at the post-transcriptional level (4). The discovery of miRNAs has been followed by findings highlighting their important and diverse roles in many molecular pathways and biological processes, including development, apoptosis, differentiation, and cell proliferation (5), as well as their implication in various human diseases including cancer. Growing evidence indicates that miRNAs can work as oncogenes or tumor suppressors, depending on which gene(s) they modulate (6). Recent evidence suggests a role for miR-SNPs in breast cancer susceptibility including work by Hu et al. where the presence of mutant alleles of MIR196A2 rs11614913 and MIR499A rs3746444 significantly increased breast cancer risk in Chinese women (7). However in genetic association analysis of Caucasian populations and functional studies in breast cancer cell lines performed by Hoffman et al. the presence of SNP in MIR196A2 rs11614913 was significantly associated with reduced risk of breast cancer, as well as less efficient processing of MIR196A2 and reduced capacity to regulate target genes, indicating additional factors may be at work in this SNP’s effect on breast cancer (8). Additionally, Kontorovich et al. found 2 SNPs, rs6505162 and rs895819 located in MIR423 and MIR27A precursors respectively, to be significantly associated with decreased risk of breast cancer in BRCA2 mutation carriers from a Jewish population (9). However the SNP rs895819 was also significantly associated with reduced risk of developing breast cancer in families with a history of non-BRCA related breast cancer in a later study performed by Yang et al (10). Finally rs2910164, a miR-SNP located in the 3p strand of MIR146A, was found to be associated with a younger age of diagnosis in familial breast cancer for BRCA1 mutation carriers (11). Many epidemiological studies have examined the association of miRNA SNPs with cancer susceptibility (12). In BC, several case–control studies and meta-analyses have evaluated associations between miRNA gene polymorphisms and BC risk in European, (13) Asian (14), Arab (15), and Jewish (9) populations. Many studies have been conducted to investigate the association between miR-423 rs6505162C/T and Breast cancer risk; however, the results were not consistent.

**MATERIAL AND METHOD**

This study was conducted on 90 subjects among whom 30 were Breast cancer cases, 30 were Women at higher risk of breast cancer (WHR) and 30 were sex matched healthy controls. The Breast cancer cases were histologically confirmed. The sex-matched healthy women with no history of any types of cancer and not related to the patients. The first degree relatives of Breast cancer patients were selected as Women at higher risk of breast cancer. Patients with any previous history of cancer were excluded from this study.

**Sample collection**

After assessing the clinicopathological findings of Breast cancer patients, a 4ml sample of peripheral blood was collected by venipuncture in EDTA tubes from each patient and healthy control.

**DNA extraction**

DNA extraction was done 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 miR-423 rs6505162C>T by using amplification-refractory mutation system PCR

The miR-423-rs6505162 C>T genotyping was done by using amplification-refractory mutation system PCR. The ARMS primers were designed by using Primer3 software as depicted in Table 1.
Table 1. Primer sequence of miR-423 genotyping (rs6505162 C>T)

<table>
<thead>
<tr>
<th>Direction</th>
<th>Sequence</th>
<th>Product size</th>
</tr>
</thead>
<tbody>
<tr>
<td>miR-423 FO:</td>
<td>5′-TTTTCCCGGATGGAAGCCCGAAGTTTGA-3′</td>
<td>336 bp</td>
</tr>
<tr>
<td>miR-423 RO:</td>
<td>5′-TTTTGCGGCAACGTATACCCCAATTTCC-3′</td>
<td></td>
</tr>
<tr>
<td>miR-423FI (T allele):</td>
<td>5′-TGAGGCCCCCTCAGCTCTGCTTCACA-3′</td>
<td>228 bp</td>
</tr>
<tr>
<td>miR-423 RI (C allele):</td>
<td>5′-CAAGCGGGGAGAAACTCAAGCGCGAGG-3′</td>
<td>160 bp</td>
</tr>
</tbody>
</table>

The ARMS-PCR was performed in a reaction volume of 25uL containing template DNA (50ng), FO -0.30uL , RO -0.30uL , FI-0.20uL , RI -0.20uL of 25pmol of each primers and 10uL from GoTaq® Green Master Mix (cat no M7122) (Promega, USA). The final volume of 25 uL was adjusted by adding nuclease free ddH2O .Finally 2ul of DNA was added from each patient. 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 miR-423-rs6505162 C/T gene, resulting a band of 336bp to act as a control for DNA quality and quantity. Primers Fwt and RO amplify a wild-type allele (C allele), generating a band of 160bp, and primers FO and Rmt generate a band of 228bp from the mutant allele (T allele) as depicted in Figure 1).

STATISTICAL ANALYSIS

The differences in the miR-423 gene allele and genotype frequencies between the three groups were evaluated using Chi-square test. The associations between miR-423 (rs6505162 C>T) genotypes and women at higher risk of breast cancer, breast cancer cases and healthy controls were estimated by computing the odds ratios (ORs), risk ratios (RRs) and risk differences (RDs) with 95 % confidence intervals (CIs A p-value < 0.05 was considered significant. All statistical analyses were performed using SPSS 16.0.

RESULTS

This case controls study was performed on ninety subjects .Thirty of ninety (30/90) were Breast cancer cases, Thirty of ninety (30/90) were women at higher risk of breast cancer (WHR) and Thirty of ninety (30/90) were sex matched healthy controls .All the samples were screened for miR-423 rs6505162 C>T genotyping by using amplification-refractory mutation system PCR assay. The frequencies of all three genotypes of miR-423 rs6505162 gene polymorphism CC,CT and TT in three groups was analyzed as depicted in the Figure 2.

The frequencies of all three genotypes CC,CT,TT reported in the women at higher risk of breast cancer was CC 20%, CT 43% and TT 37% , Breast cancer patients was CC 53%, CT 37% and TT 10% and in sex matched healthy controls was CC 57%, CT 30% and TT 13%.The significant difference was observed in genotype distribution between women at higher risk of breast cancer and Breast cancer cases (P=0.04) and between sex match healthy controls and Women at higher risk of breast cancer (P=0.009).
The genotype distribution of miR-423 rs6505162C>T gene variation between women at higher risk of breast cancer (WHR) and Breast cancer Case is summarized in Table 3. A statistically significant difference was observed in the frequencies of miR-423CC, CT and TT genotypes among women at higher risk of breast cancer (WHR) and Breast cancer Case (p=0.040). The frequency of T allele (fT) was found to be higher among women at higher risk of breast cancer (0.58) than the breast cancer cases (0.29) whereas, the higher frequency of C allele (fC) was observed among Breast cancer cases (0.71) than the women at higher risk of breast cancer (WHR) (0.42). The T allele was found to be a risk factor for Breast cancer as depicted in table 2.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>N</th>
<th>CC</th>
<th>CT</th>
<th>TT</th>
<th>C</th>
<th>T</th>
<th>X2</th>
<th>Df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>High risk women</td>
<td>30</td>
<td>6(20%)</td>
<td>13(43%)</td>
<td>11(37%)</td>
<td>0.42</td>
<td>0.58</td>
<td>6.02</td>
<td>2</td>
<td>0.04</td>
</tr>
<tr>
<td>Breast cancer women</td>
<td>30</td>
<td>16(53%)</td>
<td>11(37%)</td>
<td>03(10%)</td>
<td>0.71</td>
<td>0.29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

miR-423 rs6505162C>T gene variation between women at higher risk of breast cancer (WHR) and sex matched healthy controls. The genotype distribution of miR-423 rs6505162C>T gene variation between women at higher risk of breast cancer (WHR) and sex matched healthy controls is summarized in Table 3. A statistically significant difference was observed in the frequencies of miR-423CC, CT and TT genotypes among women at higher risk of breast cancer (WHR) and sex matched healthy controls (p=0.009). The frequency of T allele (fT) was found to be higher among women at higher risk of breast cancer (WHR) (0.58) than the sex matched healthy controls (0.28) whereas, the higher frequency of C allele (fC) was observed among sex matched healthy controls (0.72) than the women at higher risk of breast cancer (WHR) (0.42). The T allele was found to be a risk factor for women at higher risk of breast cancer (WHR) as depicted in table 3.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>N</th>
<th>CC</th>
<th>CT</th>
<th>TT</th>
<th>C</th>
<th>T</th>
<th>X2</th>
<th>Df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>High risk women</td>
<td>30</td>
<td>6(20%)</td>
<td>13(43%)</td>
<td>11(37%)</td>
<td>0.42</td>
<td>0.58</td>
<td>9.25</td>
<td>2</td>
<td>0.009</td>
</tr>
<tr>
<td>Healthy women</td>
<td>30</td>
<td>17(57%)</td>
<td>9(30%)</td>
<td>04(13%)</td>
<td>0.72</td>
<td>0.28</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Risk of Women at higher risk of breast cancer, Breast Cancer with miR-423 (rs6505162C/T) gene polymorphism in BC patients:

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 miR423-rs6505162C>T genotypes and risk of Women at higher risk of breast cancer in Saudi patients as depicted in table 4.

Our findings showed that the miR-423-rs6505162C>T gene variant was associated with an increased risk of Women at higher risk of breast cancer in Codominant inheritance model (OR=0.20, 95% CI=(0.05-0.80) p=0.020, TT vs CC; Dominant model (OR=0.26, 95% CI= (0.86-0.81), p=0.020, CT+TT vs CC) and no significance was reported in Recessive model (OR=0.38, 95%CI= (0.12-1.21), P=0.07, TT vs CC+CT) inheritance models tested. While, the T allele significantly increased the risk in Women at higher risk of breast cancer (OR= 0.38; 95% CI= (0.18-0.78); p=0.009 compared to C allele.
**Table 4: Association of miR-423 rs6505162 C>T gene variation with breast cancer**

<table>
<thead>
<tr>
<th>Genotypes</th>
<th>High risk women (N=30)</th>
<th>Breast cancer patients (N=30)</th>
<th>OR (95% CI)</th>
<th>Risk Ratio (RR)</th>
<th>P-Val</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Codominant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>miR-423 -CC</td>
<td>06</td>
<td>16</td>
<td>1(ref.)</td>
<td>1(ref.)</td>
<td></td>
</tr>
<tr>
<td>miR-423 -CT</td>
<td>13</td>
<td>11</td>
<td>0.31 (0.019-1.09)</td>
<td>0.50 (0.23-1.09)</td>
<td>p=0.060</td>
</tr>
<tr>
<td>miR-423 -TT</td>
<td>11</td>
<td>03</td>
<td>0.20 (0.05-0.80)</td>
<td>0.42 (0.19-0.90)</td>
<td>p=0.020</td>
</tr>
<tr>
<td><strong>Dominant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>miR-423 -CC</td>
<td>06</td>
<td>16</td>
<td>1(ref.)</td>
<td>1(ref.)</td>
<td></td>
</tr>
<tr>
<td>miR-423 (CT+ TT)</td>
<td>24</td>
<td>14</td>
<td>0.26 (0.86-0.81)</td>
<td>0.46 (0.22-0.96)</td>
<td>p=0.020</td>
</tr>
<tr>
<td><strong>Recessive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>miR-423 (CC+ CT)</td>
<td>19</td>
<td>27</td>
<td>1(ref.)</td>
<td>1(ref.)</td>
<td></td>
</tr>
<tr>
<td>miR-423 (TT)</td>
<td>11</td>
<td>06</td>
<td>0.38 (0.12-1.21)</td>
<td>0.63 (0.39-1.04)</td>
<td>p=0.07</td>
</tr>
<tr>
<td><strong>Allele</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>miR-423 -C</td>
<td>25</td>
<td>43</td>
<td>1(ref.)</td>
<td>1(ref.)</td>
<td></td>
</tr>
<tr>
<td>miR-423-T</td>
<td>35</td>
<td>17</td>
<td>0.38 (0.18-0.78)</td>
<td>0.60 (0.41-0.88)</td>
<td>p=0.009</td>
</tr>
</tbody>
</table>

**DISCUSSION**

In the present study, we analyzed the correlation between genetic polymorphisms in miR-423- rs6505162 and susceptibility to women at higher risk of breast cancer (WHR) in Saudi Arabian population. The miR-423 - rs6505162 polymorphism was revealed to be associated with an overall increased risk in women at higher risk of breast cancer (WHR). The higher prevalence of miR-423-TT genotypes were reported in women at higher risk of breast cancer 37% vs breast cancer 10% & gender matched controls 13% similarly the higher prevalence of miR-423-CT genotypes were reported in women at higher risk of breast cancer 43% vs breast cancer 37% & gender matched controls 30% . The significant difference was observed in genotype distribution between women at higher risk of breast cancer and Breast cancer cases (P=0.04) and between sex match healthy controls and Women at higher risk of breast cancer (P=0.009). A confirmed carrier of a genetic mutation that increases the risk for breast cancer, (BRCA1 or BRCA2 ). Confirmed” means the person has had genetic testing and a genetic mutation was found. They may not have breast cancer but they “carry” the genetic mutation and are at a higher risk for developing the disease. Most inherited cases of breast cancer are associated with one of two abnormal genes: BRCA1 or BRCA2 gene. Women with an abnormal BRCA1 or BRCA2 gene have up to an 85% lifetime risk of developing breast cancer besides have a much higher-than-average lifetime risk of ovarian cancer; estimates range from 15% to 60% .

**CONCLUSION**

Our findings indicated that microRNA-423 TT genotype and T allele are associated with an increased susceptibility to Breast cancer in high risk women . Furthers studies with larger sample sizes are necessary to confirm our findings.

**Acknowledgement:** We acknowledge the support from the Deanship of Scientific Research, University of Tabuk for funding this research (S-1438-0200).

**Ethical Clearance:** This Research study was approved by the Research ethics committee, University of Tabuk.
Conflict of Interest: Authors do not have conflict of interest.

REFERENCES


The Susceptibility of Aedes Aegypti to Cypermethrin Used in Vector Control Programs of Dengue Hemorrhagic Fever

Asep Tata Gunawan¹, Arif Widyanto¹, Hari Rudijanto IW¹, Sugeng Abdullah¹, Wibowo Ady Sapta², Ahmad Fikri³, Ismi Rajiani³

¹Lecturers, Poltekkes Kemenkes Semarang, ²Lecturers, Poltekkes Kemenkes Tanjung Karang, ³Deputy to Chairman, STIA Dan Manajemen Kepelabuhan Barunawati, Surabaya, Indonesia

ABSTRACT

Background: Cypermethrin is an insecticide commonly used in dengue vector control program. Reasonably different levels of susceptibility in mosquitoes of Aedes aegypti in the two districts of Central Java Indonesia are suspected to occur as a result of using cypermethrin continuously.

Method: The study was conducted using a survey method to the community to take samples of Aedes aegypti eggs after becoming an adult female mosquito toward the susceptibility of 0.05% cypermethrin.

Results: The results showed that the mosquito Aedes aegypti in Kebumen are resistant to the insecticide 0.05% cypermethrin. Similarly, the mosquito Aedes aegypti in Banyumas also is immune to the same insecticide.

Conclusion: Mosquitoes in the district of Kebumen and Banyumas regency are resistant to the insecticide of 0.05% cypermethrin. It is suggested for health agencies to conduct periodic evaluations (3-5 years) on the effectiveness of pesticides used, especially in areas with high endemicity status so that control can be applied efficiently.

Keywords: vulnerability, Aedes aegypti, cypermethrin

INTRODUCTION

The number of cases of DHF (Dengue) always fluctuate annually (1). Various efforts to control dengue vector has been implemented either physically, chemically or biologically. Physical controls in Indonesia are commonly known as the practice of 3M, (Menguras, Menutup, Mengubur- to drain, to shut, to bury) namely mosquito nest elimination using 3M (drain, close and bury or destroy) that remove the tub or toilet, shut the water reservoirs (buckets, drums, jars) and bury or destroy the used goods such as cans, tires, plastic, and others. This method, however, has not worked satisfactorily proved by the number of dengue cases are still common (2).

Some vector control method has been widely known and used by the dengue control program at the central level in the areas of environmental management, biological control, chemical control, community participation, protection of individuals and the rule of law. Control of Dengue is primarily intended to break the chain of transmission, i.e., the vector control. The dengue vector control in endemic areas which are not targeted will not be sustainable and has not been able to break the chain of transmission. This may due to the method adopted not referring to the data/information vectors as well as still rely on the use of insecticides.

One of the efforts to control the vector is through cut transmission by killing adult mosquitoes quickly with insecticide application or known by the term fogging. It is still often found fogging is performed not in appropriate dose, not to the right target and not based on a scientific basis. This triggeres the occurrence of resistance in addition to the fact that some places use the same insecticide group in a long time. Insect resistance
to insecticides commonly occurs after 2-20 years of use. Cypermethrin is insecticides often used in dengue vector control programs in each district in Central Java in recent years and ironically this substance is found no longer useful as the mosquito has been resistant (3) besides to 0.8% malathion and 0.25% permethrin (4).

Kebumen and Banyumas are two districts in the southern part of Central Java province which includes using cypermethrin in the last three years. Kebumen is a county located in the lowlands and by the Indonesian Ocean, while Banyumas is situated in the highlands and bordered by the beach. Their geographical and topographical differences that allow growth, the joy of life and adaptability of mosquito Aedes aegypti can be different as well. Cypermethrin associated with the use of insecticides may have different levels of vulnerability in the mosquito Aedes aegypti in the two districts as a result of using cypermetrin continuously.

**METHODOLOGY**

This type of research is observational research with a cross sectional approach by conducting surveys to endemic areas of dengue fever in the district of Kebumen and Banyumas in Central Java province, Indonesia.

Samples were the Aedes aegypti obtained from the highest dengue cases in Kebumen (districts of Sempor) and Banyumas (the District of South Purwokerto). Adult mosquitoes collected by hatch (rearing) obtained through the installation of ovitrap across the two districts. The number of mosquitoes used in research is 125 each region bringing the total number of mosquitoes = 125 head x 2 areas = 250 Aedes aegypti adult female mosquitoes. Tests were carried out by using WHO standard kit equipment such as susceptibility test set consisting of three pairs of test tubes and three pairs of control tubes. Test tube comprises of a tube collector mosquito (risela oil-coated paper) and the tube contact insecticides (coated paper impregnated).

The calculation result is determined by the provision if the results obtained mosquito mortality in the control group. If it is <5%, then it is ignored. If the death of larvae in the control group is > 20%, the research is considered failed, and the test should be repeated. The percentage protection (feeding inhibition, mortality or knockdown effect) was estimated by Abbot formula as PE = (NC - NT)/NT × 100%, where NC and NT are the number of the mosquito on control and treatment, respectively (5). The mortality rate of Aedes aegypti is interpreted as follows:

- vulnerable: if the death of the mosquito larvae is 98-100%
- tolerant: if the death of larvae mosquito is 80-97%
- resistant: when the mosquito larvae mortality is <80%

**RESULTS**

The insecticides used for fogging on the location of the study are described below.

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Insecticides Group</th>
<th>Frequency</th>
<th>Duration of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kebumen Regency</td>
<td>Synthetic pyrethroid</td>
<td>1-2 times/year</td>
<td>&gt; 5 years</td>
</tr>
<tr>
<td>2.</td>
<td>Banyumas Regency</td>
<td>Synthetic pyrethroid</td>
<td>1-2 times/year</td>
<td>&gt; 5 years</td>
</tr>
</tbody>
</table>

Temperature measurements are carried out every day, i.e., air temperature at the test and 24 hours after testing. Temperature measurements obtained can be seen in the table below.

<table>
<thead>
<tr>
<th>Sampel</th>
<th>Data Testing</th>
<th>Initial temperature (°C)</th>
<th>Temperature after 24 hours (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jatinegara Village</td>
<td>1: 25</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2: 25</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3: 25</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>Karangklesem Sub-district</td>
<td>1: 25.5</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2: 25.5</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3: 25.5</td>
<td>26</td>
</tr>
</tbody>
</table>
Humidity measurements were performed everyday, i.e., air humidity during testing and observation 24 hours after trial. The humidity measurements obtained can be seen in the table below.

### Table 3. Humidity Measurement Results

<table>
<thead>
<tr>
<th>Sample</th>
<th>Data Testing</th>
<th>Initial humidity(%)</th>
<th>Humidity after 24 hours (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Jatinegara Village</td>
<td>1</td>
<td>77</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>77</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>77</td>
<td>78</td>
</tr>
<tr>
<td>2 Karangklesem Sub-district</td>
<td>1</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>78</td>
<td>78</td>
</tr>
</tbody>
</table>

The susceptibility status of Aedes aegypti resistance to 0.05% Cypermethrin is obtained through test or susceptibility test. The resistance test data was collected from the results of Aedes aegypti mosquito count which died in the 0.05% Cypermethrin, exposure group after being observed for 1x24 hours. Aedes aegypti mosquito resistance test result in exposure group of 0.05% Cypermethrin insecticide in Jatinegara village can be seen in the following table.

### Table 4. Aedes aegypti Mosquito Resistance Test Results in Jatinegara Village

<table>
<thead>
<tr>
<th>No.</th>
<th>Samples</th>
<th>Mosquitos</th>
<th>Death</th>
<th>Alive</th>
<th>Mortality Rate (%)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>20</td>
<td>3</td>
<td>17</td>
<td>15</td>
<td>Resistant</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>20</td>
<td>7</td>
<td>13</td>
<td>35</td>
<td>Resistant</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>20</td>
<td>7</td>
<td>13</td>
<td>35</td>
<td>Resistant</td>
</tr>
<tr>
<td>Average</td>
<td>20</td>
<td>5.7</td>
<td>14.3</td>
<td>28.3</td>
<td></td>
<td>Resistant</td>
</tr>
</tbody>
</table>

From table 4 it can be seen that the population of Aedes aegypti mosquitoes in Jatinegara village, Kebumen regency with 3 times test have Aedes aegypti mosquito death rate respectively: 1st test as much as 15%, 2nd test as much as 35%, and 3rd test as much as 35% with the average percentage of deaths is 28.3%. Thus it can be said that Aedes aegypti mosquitoes in Jatinegara Village, Kebumen Regency have been resistant to 0.05% Cypermethrin insecticide.

In the control group, the test was performed using three sets of test tubes. The experimental procedure is similar to the resistance test in the exposed group. What distinguishes is in the control group it applies a non-insecticide paper. The death of Aedes aegypti mosquito in the control group can be seen in the following table.

### Table 5. Resistance Test Results Aedes aegypti mosquito in the Control Group

<table>
<thead>
<tr>
<th>No.</th>
<th>Samples</th>
<th>Mosquitos</th>
<th>Death</th>
<th>Alive</th>
<th>Mortality Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>20</td>
<td>0</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>20</td>
<td>0</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>20</td>
<td>1</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Average</td>
<td>20</td>
<td>0.3</td>
<td>19.7</td>
<td>1.7</td>
<td></td>
</tr>
</tbody>
</table>

Aedes aegypti mosquito resistance test result in exposure group of 0.05% Cypermethrin insecticide in Karangklesem Urban Village, South Purwokerto District, Banyumas Regency can be seen in the following table.
Table 6. Resistance Test Result of Aedes aegypti Mosquito on Exposure Group

<table>
<thead>
<tr>
<th>No.</th>
<th>Samples</th>
<th>Mosquitos</th>
<th>Death</th>
<th>Alive</th>
<th>Mortality Rate (%)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>20</td>
<td>7</td>
<td>13</td>
<td>35</td>
<td>Resistant</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>20</td>
<td>5</td>
<td>15</td>
<td>25</td>
<td>Resistant</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>20</td>
<td>2</td>
<td>18</td>
<td>10</td>
<td>Resistant</td>
</tr>
<tr>
<td>Average</td>
<td>20</td>
<td>4.7</td>
<td>15.3</td>
<td>23.3</td>
<td>Resistant</td>
<td></td>
</tr>
</tbody>
</table>

Based on Table 6, it can be seen that the population of Aedes aegypti mosquito in Karangklesem village, South Purwokerto subdistrict, Banyumas regency with 3 times test have Aedes aegypti mosquito death rate: 35% in experiment 1, 25% in test 2, and check 3 as much as 10% with the average percentage of death 23.3%. Thus, it can be said that Aedes aegypti mosquito in Karangklesem Village, District of South Purwokerto, Banyumas Regency has been resistant to 0.05% Cypermethrin insecticide.

Table 7. Aedes aegypti Mosquito Resistance Test Result in Control Group in Banyumas Regency

<table>
<thead>
<tr>
<th>No.</th>
<th>Samples</th>
<th>Mosquitos</th>
<th>Death</th>
<th>Alive</th>
<th>Mortality Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>20</td>
<td>0</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>20</td>
<td>1</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>20</td>
<td>1</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Average</td>
<td>20</td>
<td>0.7</td>
<td>19.3</td>
<td>3.3</td>
<td></td>
</tr>
</tbody>
</table>

Based on Table 7 it can be seen that the control group mortality from Aedes aegypti mosquitoes on the 0.05% Cypermethrin insecticide resistance test in Karangklesem Subdistrict of Purwokerto Selatan District of Banyumas Regency with three times test, the control group mortality rate is 3.3%.

DISCUSSION

The result of temperature measurement shows that the temperature in the study room is 25-26 °C. In general, mosquitoes will lay eggs at temperatures around 20-30 °C, so it can potentially breed the Aedes aegypti mosquito (6).

The optimal temperature of mosquito breeding is between 25 °C-27 °C and will stop entirely at <10 °C or>40 °C (7). Thus the temperature of the room in the laboratory is still in optimum condition for the heat of Aedes aegypti mosquito development. The result of initial humidity test measurement and after observed 1x24 hour gets the result between 77-78%. The need for high humidity affects mosquitoes to find moist and wet places as a place to rest or rest. At moisture less than 60%, the age of the mosquito is short (8). Humidity in the laboratory room is adjusted with moisture in place of mosquitoes to rest or to rest area, so that at the time of mosquito breeding and at the time of the testing process of mosquito in excellent condition and stable.

The test data of resistance with susceptibility test method was obtained from Aedes aegypti mosquito count which died on Cypermethrin 0.05% exposure group after observed for 1x24 hours. Aedes aegypti mosquito resistance test in 0.02% Cypermethrin insecticide group in Jatinegara village, Sempor sub-district, Kebumen regency with three times analysis has Aedes aegypti mosquito average percentage of death = 28.3%. Thus it can be said that Aedes aegypti mosquitoes in Jatinegara Village, Sempor Sub-district, Kebumen Regency have been resistant to 0.05% Cypermethrin insecticide.
In the control group, the test was performed using three sets of test tubes. The death of Aedes aegypti mosquitoes in the mean control group was 1.7%. Due to the control mortality <5%, it does not need to be corrected with the Abbot formula. Aedes aegypti susceptibility or resistance to Cypermethrin 0.05% in Karangklesem Village, District of Purwokerto Selatan, Banyumas Regency known that Aedes aegypti mosquito average percentage of death is 23.3%. Thus it can be said that Aedes aegypti mosquito in Karangklesem Village, District of South Purwokerto, Banyumas Regency has been resistant to Cypermethrin insecticide 0.05%.

Tests on the control group of Aedes aegypti mosquito in Karangklesem Village, District of Purwokerto Selatan, Banyumas Regency were done using three sets of the test tube. The death of Aedes aegypti mosquitoes in the control group was 3.3%. Due to the control mortality <5%, it does not need to be corrected with the Abbot formula.

This way, communities should not always use insecticides in mosquito control but advisable to control by methods of repair or to clean the environment such as eradication of mosquito nest.

Other researchers may conduct susceptibility studies of Aedes aegypti mosquitoes against other types of insecticides or similar research with different research situation to enlarge the generality.

CONCLUSION

The application of insecticides in the control of dengue vectors performed at the study sites (Kebumen and Banyumas districts) by the health authorities has found the use of synthetic pyrethroid insecticides for more than five years. This makes Aedes aegypti mosquitoes in Jatinegara village, Sempor sub-district, Kebumen regency has been resistant to 0.05% cypermethrin insecticide (average percentage of mosquito deaths test of 28.3%). Likewise, the results of mosquito susceptibility test using susceptibility test method showed that Aedes aegypti mosquito in Karangklesem village, South Purwokerto subdistrict, Banyumas district had been resistant to 0.05% cypermethrin insecticide (average of mosquito death rate percentage was 23.3%). This makes the government necessary to find an alternative to combat the mosquito as in ineffectiveness of the insecticide may be one cause affecting the transmission of dengue fever is hard to eliminate.

Conflict of Interest: The authors have no conflict of interests related to the conduct and reporting of this research.

Source of Funding: Source of the fund for this project was by Politeknik Kesehatan Kementrian Kesehatan Semarang, Indonesia.

Ethical Clearance: Before conducting the study, written permission was obtained from Politeknik Kesehatan Kementrian Kesehatan Semarang, Indonesia.

REFERENCES
Effectiveness of Hand Hygiene Training by Kirkpatrick Model

Widayanti

Department of Health Policy and Administration, Faculty of Public Health, Airlangga University, Indonesia

ABSTRACT

The aim of this organisational development was to improve Hand Hygiene education and training compliance in Hospital by extension, improve hand hygiene compliance. Hand Hygiene is identified as the single most important intervention in reducing the transmission of Healthcare Associated Infections (HAIs). In 2009, The World Health Organization published comprehensive evidence-based guidelines on Hand Hygiene in healthcare, which introduced a standardized approach to Hand Hygiene practice; “The Five Moments for hand Hygiene”. These guidelines have been adopted by the hospital and core to our education and training programme. The model was used to guide this research. The Kirkpatrick model was employed to evaluate the hand hygiene education and training, effectiveness of training at the different levels was being evaluated through construct on the basis of literature review. For level the respondents are who had completed training 7 months earlier. The results indicated that reaction of the participants were positive for training, secondly they had applied skills and knowledge which they had learnt from training. However, advanced research is needed to asses the impact of applying hand hygiene on spread of infection in hospital patient through measuring HAIs rate in this hospital.

Keywords: Training evaluation, Kirkpatrick model, hand hygiene compliance, HAIs

INTRODUCTION

Nosocomial infections are a major problem faced by hospitals and they are mostly caused by hand contact. Hand hygiene is the simplest and most effective way to prevent nosocomial infections \(^\text{[1]}\). In accordance with Sung Chin Pan, \(^\text{[19]}\) hand washing compliance rate is still low on health workers. An education and training program on hand hygiene is needed to provide knowledge, understanding, and improve skills for hand hygiene according to WHO’s Hand Hygiene five-point guidance.

Hand Hygiene Training helps health workers to understand the knowledge and skills needed to perform their daily work by prioritizing patient safety \(^\text{[14]}\). By evaluating Hand Hygiene Training of Kirkpatrick’s four levels model it is expected to be measured the training effectiveness, the improvement efforts can be done for the implementation of further training or as a proposal to management and organization to improve the implementation of hand hygiene so as to achieve organizational goals in accordance with key indicators that have been set.

Training and Development

Education and training is the process of adding, encouraging and updating the knowledge, skills and abilities of human resources to move towards better performance in accordance with organizational goals \(^\text{[6]}\). It also encourages organizational commitment, improves employee’s performance to address internal and external challenges, encourages increased knowledge and improves skills, work process efficiency, problem solving development and also builds self confidence that will has impact on performance improvement \(^\text{[7]}\).

Education and training programs should be evaluated to determine how efforts to improve the next program, to determine whether the program needs to be continued or not and to determine the performance of the education and training units and the determination of the budget \(^\text{[7]}\).

Training Evaluation Model

Kirkpatrick Model

An easy-to-apply training evaluation model is Kirkpatrick’s four levels \(^\text{[10]}\).
a. Reaction; The measured aspect is the level of satisfaction of the training participants on the training implementation, including elements of materials, implementation, means, and instructor’s ability. The material elements are divided into systematics and presentation of the material, the ease of the material to be understood, the contribution of the material in the enhancement of knowledge and insight and it can be applied to the work, and the conformity of the material with the training objectives. The implementation elements are divided into several sub-elements of conformity with the stipulated schedule, the timeliness of the training, the willingness of the committee to assist the trainees. The elements of facility are divided to be sub-elements of audio-visual or visual aid quality, consumption, seminar kits, room and room facilities (light, wide, acoustics and ventilation). Elements of instructor’s ability are divided into sub-elements of material mastery, delivery techniques, how to answer questions, language and gestures. The evaluation is done by using a questionnaire that should be filled by the trainees at the end of the training session.

b. Learning; The measured aspect is the addition of knowledge and understanding level of the participants after the training. The measured result is the learning result rather than the impact on the trainees’ performance. Evaluation is done by providing pre-post test at the beginning and end of the training session.

c. Behaviour; How the behaviour change occurs in each individual trainees, this means how the knowledge acquired during training can be developed into skills improvement and applied in daily work.

d. Result; It is the process of measuring how the training program has impacts on the achievement of organizational goals, as a result of improving the trainees’ performance. In this case the evaluation is done by looking at the hospital key indicator that is HAIs rate.

Hand Hygiene and Healthcare Associated Infections (HAIs)

The presence of close relationship between hand hygiene compliance and reduced risk of HAIs infection (2,3). Hand Hygiene is the foundation of the patient’s safety which will always be applied with the prescribed procedures in each process of patient care. But the low compliance rates are a common problem commonly found in health care (25). This is what causes the transmission of microorganisms that causes HAIs can not be avoided. The high compliance rates of hand hygiene and the existence of organizational policies on this matter have an impact on the decrease in hospital HAIs (3). The key are not lies only in health workers, but also the policies and commitments of leadership.

The effectiveness of hand hygiene compliance measurements requires the same perception of hand hygiene process terminology, which includes indications, opportunities, and actions (4).

Indication is a rational principle that becomes the basis to conduct hand hygiene. The hospital should have written policy on technical and indications to conduct hand hygiene. In accordance with WHO’s Manual for Observer, the definition of hand hygiene indication “is the reason why hand hygiene is necessary at a given moment”. It is based on the risk of transmitting microbe from one surface to another, using terminology before and after contact. Some examples of indications for hand hygiene based on both WHO and CDC are as follows:

- Before contact with patient
- Before performing aseptic action
- After contact with blood or blood products and body fluids
- After contact with the patient
- After touching the environment around the patient

When measuring the compliance rates, it should be clear about these indications, in accordance with WHO, it was referred as “Five Moment Hand Hygiene” (1). Opportunities represent an opportunity to perform hand hygiene in a period of time when health workers perform patient care in accordance with prescribed indications. Action shows the performance of health workers while performing hand hygiene. Every opportunity will always be followed by the implementation of hand hygiene conducted by health workers.

HAIs (Healthcare Associated Infections) are an infection that occurs during the patient receiving care at the hospital or other health facility, the infection is not found or not being in an incubation period at the time of patient’s arrive. Included in this definition are infections acquired in hospital but only show symptoms
after the patient was departed from the hospital. WHO \(^{(1)}\), Global data on HAIs is currently very limited, but it is generally mentioned that the prevalence of HAIs in developing countries is higher than developed countries (10.1% - 7.6%). The most commonly found infections are those related to the use of invasive instruments or procedures i.e. catheter associated urinary tract infection (CAUTI), central-line associated bloodstream infection (CLABSI), ventilator associated infection (VAP), and Surgical Site Infection (SSI), some include peripheral IV line Infection or Phlebitis. HAIs can be prevented by doing hand hygiene that is the key to patient-based care, because hand hygiene is the easiest, cheapest and effective procedure to prevent HAIs \(^{(2)}\). The research objectives are to evaluate the effectiveness of hand hygiene training with Kirkpatrick’ framework including 4 levels: reaction, learning, behaviour, and results.

MATERIALS AND METHOD

Hand hygiene training evaluation was conducted in January 2018 while the Training of Infection Prevention and Control which contained Hand Hygiene material was held in May 2017. As the priority participants were the workers of Surabaya Islamic Hospital who served in high risk units such as Operation Room, Maternity Room, Haemodialysis Unit, Laboratory Unit, Radiology Unit, ICU, Zam-zam Room (Neonatus), Emergency Unit, Nutrition Unit, and Sanitation and Environmental Health Unit. Training location is at meeting room of Surabaya Islamic Hospital. Training was conducted for two days starting at 08.00 up to 16.00 o’clock. The numbers of trainees in the initial stage are 30 participants. The training instructor is the team of Infection Prevention and Control that has been certified in basic level of IPC training.

This study focuses on evaluation of Hand Hygiene training based on Kirkpatrick’s four level model, including reaction from trainees, learning after training, behaviour change after training, and training contribution to the achievement of hospital key indicator. For level 1, evaluation was performed by filling out the questionnaire of trainees’ satisfaction. Level 2 was assessed from the pre-post test of trainees based on the WHO’s Hand Hygiene Knowledge Test questionnaire. For level 3, the evaluation was performed by measuring the hand hygiene compliance rate, which was assessed after 8 months post training. The training compliance rate would be compared to the unattended-training health worker. Hand hygiene compliance measurements were performed with the WHO tool, i.e. HHOT (Hand Hygiene Observational Tools), and calculated using the Epiinfo method. Level 4 was measured from the hospital’s key indicator that is hospital’s HAIs rate.

FINDINGS AND DISCUSSIONS

Effectiveness of Level 1 Reaction

In overall the training process was well organized, the weakness is only on facilities and infrastructure factors that is limited space, and training time is too short compared with the given material density.

Measurement of trainees’ perception of the implementation of each element are: it is said not satisfied with the range below 50 to 60, it is said less satisfied if the range between 61 to 70, it is said satisfied if the range of values between 71 to 80, and it is said very satisfied if the range above 81 to 100.

Table 1 Level of Trainee’s Satisfaction

<table>
<thead>
<tr>
<th>Evaluation Elements</th>
<th>Score</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systematics</td>
<td>87</td>
<td>Very satisfied</td>
</tr>
<tr>
<td>Clarity</td>
<td>80</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Contribution</td>
<td>80</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Advantages</td>
<td>90</td>
<td>Very satisfied</td>
</tr>
<tr>
<td>Conformity</td>
<td>85</td>
<td>Very satisfied</td>
</tr>
<tr>
<td>Training implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule conformity</td>
<td>84</td>
<td>Very satisfied</td>
</tr>
<tr>
<td>Timeliness</td>
<td>78</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Committee assists</td>
<td>80</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Committee willingness</td>
<td>82</td>
<td>Very satisfied</td>
</tr>
<tr>
<td>Infrastructure facility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio and visual aid</td>
<td>75</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Conformity of visual aid</td>
<td>81</td>
<td>Very satisfied</td>
</tr>
<tr>
<td>Consumption</td>
<td>76</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Seminar kits</td>
<td>75</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Facilities</td>
<td>75</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Room</td>
<td>78</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Instructor ability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material mastery</td>
<td>88</td>
<td>Very satisfied</td>
</tr>
<tr>
<td>Delivery techniques</td>
<td>75</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Ability to answer questions</td>
<td>75</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Language</td>
<td>82</td>
<td>Very satisfied</td>
</tr>
<tr>
<td>Gesture</td>
<td>88</td>
<td>Very satisfied</td>
</tr>
</tbody>
</table>

Source: Education and Training Unit of Surabaya
Islamic Hospital, 2017

Effectiveness of Level 2 Learning

The measured aspect is the trainees’ understanding of the training materials. Prior to the training, a questionnaire was handed out based on WHO’s tool “Hand Hygiene Knowledge Test” and at the end of the training session was done post test with the same questionnaire.

From the result of pre-post test given during Hand Hygiene training, it is seen that there is an increase of knowledge from the training participants, where the knowledge is expected to increase their awareness to do hand hygiene in accordance with the established moment. With increasing knowledge it will encourage self confidence of workers to apply the learning culture gained during the training.

Table 2 The increasing result of Pre and Post test

<table>
<thead>
<tr>
<th>Pre Test</th>
<th>Post Test</th>
<th>Increasing</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.2</td>
<td>81.73</td>
<td>41.57</td>
</tr>
</tbody>
</table>

Source: Education and Training Unit of Surabaya Islamic Hospital, 2018

Effectiveness of Level 3 Behaviour

The impact of hand hygiene training that has been done shows the difference in compliance rate between health workers who received training and who did not. With increased knowledge it is easier for health workers to recognize risk factors for the transmission of microbes through the hands of health workers, and disconnect the transmission chain by applying hand hygiene according to established guidelines. Increased knowledge gained during training will also encourage the self confidence of health workers to apply hand hygiene skills to their daily work according to the steps in the guidelines.

Table 3: The comparison of compliance rate of hand hygiene

<table>
<thead>
<tr>
<th>Moment</th>
<th>Training</th>
<th>Non Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU room</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moment 1</td>
<td>48</td>
<td>45</td>
</tr>
<tr>
<td>Moment 2</td>
<td>85</td>
<td>49</td>
</tr>
<tr>
<td>Moment 3</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>Moment 4</td>
<td>75</td>
<td>45</td>
</tr>
<tr>
<td>Moment 5</td>
<td>46</td>
<td>30</td>
</tr>
<tr>
<td>Emergency room</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moment 1</td>
<td>42</td>
<td>22</td>
</tr>
<tr>
<td>Moment 2</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Moment 3</td>
<td>88</td>
<td>68</td>
</tr>
<tr>
<td>Moment 4</td>
<td>40</td>
<td>42</td>
</tr>
<tr>
<td>Moment 5</td>
<td>32</td>
<td>20</td>
</tr>
<tr>
<td>Inpatient room</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moment 1</td>
<td>72</td>
<td>38</td>
</tr>
<tr>
<td>Moment 2</td>
<td>80</td>
<td>72</td>
</tr>
<tr>
<td>Moment 3</td>
<td>92</td>
<td>72</td>
</tr>
<tr>
<td>Moment 4</td>
<td>68</td>
<td>37</td>
</tr>
<tr>
<td>Moment 5</td>
<td>72</td>
<td>42</td>
</tr>
</tbody>
</table>

Effectiveness Measurement of Level 4 Result

Assessment of effectiveness at the previous level should be illustrated at the level 4. With the development of knowledge and skills of health workers, they have the provision to make changes in behaviour in their daily work. The HAIs rate as a key indicator of the hospital will describe the level of workers’ compliance in hand hygiene, because the largest medium of microbe transmission is through the hands of health workers.

Limitations of the study are the duration of research between training programs implemented and the time of research that are only about 7 months, it can not describe the trend of HAIs rate. With sufficient knowledge of the basics of prevention of infections acquired during the training program it is expected the cases of HAIs such as SSI, CAUTI, VAP, CLABSI and Phlebitis can be found through the implementation of hospital surveillance. From the results of research, the HAIs rate is still below the standard set by the hospital that is 2% for SSI and 15% for Phlebitis.
Table 4 HAIs rate of Hospital

<table>
<thead>
<tr>
<th>Months</th>
<th>Phlebitis</th>
<th>SSI</th>
<th>VAP/HAP</th>
<th>CAUTI</th>
<th>CLABSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>3%0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>June</td>
<td>8%0</td>
<td>0</td>
<td>0</td>
<td>6%0</td>
<td>0</td>
</tr>
<tr>
<td>July</td>
<td>8%0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>August</td>
<td>6%0</td>
<td>0.8%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>September</td>
<td>2%0</td>
<td>0.4%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>October</td>
<td>4%0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>November</td>
<td>4%0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>December</td>
<td>4%0</td>
<td>0.5%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: IPC Committee of Surabaya Islamic Hospital, 2017

CONCLUSION

The research shows that hospital workers show increased knowledge and skills after following the hand hygiene training program. Therefore, hand hygiene training program must be done continuously. It is need further research to see the impact of HAIs rate in hospitals that are closely related to the transmission of microbes that are distributed through the hands of health workers.

Conflict of Interest: The authors whose names are listed immediately below certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers’ bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Source of Funding: All sources of research funding, including financial support, supply of equipment or materials, and manuscript submission from author.

Ethical Clearance: This study get the ethical approval from ethical committee in Faculty of Public Health, Airlangga University.

REFERENCES

4. Measuring Hand Hygiene Adherence. Overcoming the challenge (http://www.jointcommission.org)


13. Sylvester Mulli Maingi (2015), Factor Influencing Compliance with Hand Hygiene Guidelines Among Healthcare Providers in Kenya; A Case of Level Five, Embu County,

14. Noreen Hynes(2015) A hand Hygiene Education and Training Improvement Strategy in Acute Hospital Setting, Royal College of Surgeon in Ireland e-publication @RCSI


16. Ludmilla Praslova,(2010). Adaptation of Kirkpatrick’s four level models of training criteria to assessment of learning outcomes and program evaluation in higher education, Springer Science+Business Media,LLC,2019


Quantitative Risk Assesment of Crystalline Silica Exposure in Ceramics Industry

Moch. Sahri¹, Abdul Rohim Tualeka¹, Noeroel Widajati¹

¹Department of Occupational Health and Safety, Airlangga University, Surabaya, Indonesia

ABSTRACT

Crystalline silica can be found in Ceramics Industry. Ceramics are basically made of clay, feldspar and silica sand. Ceramics manufacturing process starts from the processing of materials, forming, drying, burning and gazing. Crystalline silica consists of three types of quartz, tridymite and cristobalite which are distinguished by their forming temperature. Crystaline silica dust is very dangerous for health workers are exposed continuously it can cause a silicosis. Prevention and control efforts can be done one of them by conducting a risk analysis study on crystalline silica exposure. In this research will be discussed about the analysis of crystalline silica exposure into production workers in the ceramics industry.

The purpose of this study was to assess the risk level of crystalline silica due to silicosis. Subjects in this study were 47 production workers with the exposure to crystalline silica between 0.007 – 0.4 mg/m³. From the result of risk analysis, it was found that 42.6% of workers had unsafe risk which was confirmed by radiology examination was 6.4% of workers with abnormal condition. Complaints experienced by workers include shortness of breath, cough and phlegm. Long term exposure to 5-20 years to the next tends to increase the risk of the effects caused by exposure to crystalline silica. Based on the results of this study it is recommended that decision makers take action to implement effective risk management strategies to prevent the long-term effects of crystalline silica exposure to the workplace.

Keywords: risk analysis, crystalline silica, ceramic industry

INTRODUCTION

Exposure to the existing hazards in the work environment in the ceramics industry most widely encountered is silica dust, total dust and heat pressure. Silica dust is the main pollutant in the ceramics industry because it is one part in the raw material. Crystalline silica is one of the most widely encountered minerals of the earth, with wide exposure in working environments and ambient environments. Silica belongs to Group 1 substances that are carcinogetic in humans. In China, the association with silica dust exposure and mortality from all causes of respiratory illness, respiratory tuberculosis, and cardiovascular disease is significant. Worldwide estimated at least two to three million workers work roughly exposed to silica each year. Silica crystal dust is inhaled from the work environment can cause pulmonary fibrosis (silicosis), decreased lung function, pulmonary inflammation, and lung cancer have been associated with glomerulonephritis and disorders of the liver, spleen, and immune system. The prevalence of silicosis data varies from country to country. Studies conducted in the United States show that there is 3600-7300 new cases of silicosis per year in 1987-1996. Studies conducted at a cement plant found radiological silicosis suspicion of 0.5%. A study conducted at one of the cement plants in West Java showed that the incidence of silicosis was 2.06% in 1990-2003. A previous study showed that 32% of ceramic material samples contains free silica throughout the Taiwan.

Several recent epidemiological studies have shown that the present value of standard silica dust are insufficient for guidelines to protect and prevent chronic silicosis. The threshold value of crystalline silica dust...
in Indonesia is based on the Ministry of Manpower and Transmigration No. PER.13 / MEN / X / 2011 on the threshold value of physics and chemical factors in the workplace set at 0.05 mg / m$^3$. Cases of pneumoconiosis ranked first Occupational Diseases (OD) in Japan and China. Based on the silicosis surveillance program in Ontario it was found that the incidence of silicosis was a significant increase in more than 8% of respondents after exposure to silica dust for 35 years. The risk analysis approach is one way to determine the level of risk due to crystalline silica dust present or some future time making it possible for early prevention efforts.

METHOD AND MATERIAL

This type of research is descriptive research using quantitative analysis method. The study design used was a risk analysis method taken from risk analysis steps, risk management, and risk communication used to assess and predict the occurrence of health effects as a result the presence of a hazardous exposure to this case is exposure to crystalline silica. The design of this research is cross sectional where the environmental data collection (silica dust measurement) and taking of rontgen photo taken at same time period. The population of this study are all workers that work in the production section from the processing of raw materials to packing which amounted to 50 people. The sample of this study is the total population with the exclusion factor of workers not suffering and never exposed from tuberculosis, so the sample in this study amounted to 47 people. The measurement of crystalline silica dust in the working environment is based on NIOSH 7500 method of XRD.

The risk is calculated based on the amount of intake of agent entering the worker’s body so that it can be known how much the risk of health effects on workers. The data and information required to calculate the silica dust intake of the worker’s body is all variables in the following notation (RQ).

$$I_{nk} = \frac{C \times R \times t_E \times f_E \times D_t}{W_b \times t_{avg}}$$

Level of risk to be expressed in Risk Quotient notation (RQ). To do risk characterization is done by comparing the intake of Rfc from the agent.

$$RQ = \frac{I_{nk}}{Rfd \text{ atau } Rfc}$$

The Rfc value was obtained using the data onto Chen et al of 6 μg / m$^3$. The Rfc unit is converted first into units of m$^3$ / kg / day, by multiplying the Rfc value with the adult inhalation default value of 20 m$^3$ / day and dividing by the default value of the adult 70 kg. Risk levels are expressed in numbers or decimal numbers without units. The risk level is said to be safe whenever its intake ≤ Rfc is represented by RQ ≤ 1. The risk level is said to be unsafe when the intake values ≥ Rfc is expressed by RQ ≥ 1.

FINDING

Table 1. The pattern of crystal silica dust exposure in production workers

<table>
<thead>
<tr>
<th></th>
<th>Concentration of c-silica dust</th>
<th>Respiratory rate (m$^3$ / h)</th>
<th>Intake of c-silica dust (mg / m$^3$ / day)</th>
<th>Risk Quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.0686</td>
<td>0.6572</td>
<td>0.00192</td>
<td>2.2343</td>
</tr>
<tr>
<td>Median</td>
<td>0.0540</td>
<td>0.6600</td>
<td>0.00129</td>
<td>1.5017</td>
</tr>
<tr>
<td>Mode</td>
<td>0.0540</td>
<td>0.66</td>
<td>0.00024</td>
<td>0.0459</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>0.0704</td>
<td>0.0218</td>
<td>0.00260</td>
<td>3.0251</td>
</tr>
<tr>
<td>Range</td>
<td>0.4387</td>
<td>0.10</td>
<td>0.01668</td>
<td>19.391</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.0078</td>
<td>0.59</td>
<td>0.00004</td>
<td>0.0456</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.4466</td>
<td>0.69</td>
<td>0.01672</td>
<td>19.4365</td>
</tr>
</tbody>
</table>
From table 1 the research results can be seen that the concentration of crystalline silica dust at work ranged from 0.0078 - 0.4466 mg / m$^3$ with an average of 0.0686 mg / m$^3$. The average respiration rate of workers is 0.6572 m$^3$ / hour. Intake of silica dust based on exposure pattern and anthropometric data of worker ranged from 0.00004 - 0.01672 mg / m$^3$ / day with average intake 0.00192. Risk level (RQ) ranged from 0.0456 - 19.4365 with value RQ ≥ 1 equal to 42.6% from total respondent. Age of respondents in this study between 23 - 56 years with an average age of 42.38 years. The working period ranges from 2 - 25 years with an average of 18.06 years. Workers work for 8 hours per day with 1 hour break time to exit the workroom so that the effective hours of labor are in the workroom for 7 hours.

**Tabel 2. Estimate the value of the risk level of chronic exposure to production workers**

<table>
<thead>
<tr>
<th>Duration</th>
<th>Risk Quotient (RQ)</th>
<th>Percentsage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 year</td>
<td>RQ ≤ 1</td>
<td>51.1</td>
</tr>
<tr>
<td></td>
<td>RQ ≥ 1</td>
<td>48.9</td>
</tr>
<tr>
<td>10 year</td>
<td>RQ ≤ 1</td>
<td>42.6</td>
</tr>
<tr>
<td></td>
<td>RQ ≥ 1</td>
<td>57.4</td>
</tr>
<tr>
<td>15 year</td>
<td>RQ ≤ 1</td>
<td>34.0</td>
</tr>
<tr>
<td></td>
<td>RQ ≥ 1</td>
<td>66.0</td>
</tr>
<tr>
<td>20 year</td>
<td>RQ ≤ 1</td>
<td>29.8</td>
</tr>
<tr>
<td></td>
<td>RQ ≥ 1</td>
<td>70.2</td>
</tr>
</tbody>
</table>

Tabel 2. shows that in the projection of exposure over the next 20 years an increase in the value of RQ ≥ 1 can be interpreted that there is an increased risk due to exposure to c-silica dust up to 20 years in the future.

**DISCUSSION**

Continuous exposure to c-silica dust can have both long-term and short-term effects$^{16}$. The source of c-silica dust part production comes from raw materials in the form of clay and silica sand containing free silica that make ceramic to be harder and stronger$^{12}$. The heating process in the production process to a temperature of about 1200 °C will also form another fraction of the more reactive c-silica dust. The level of c-silica dust has a uniform distribution throughout the workplace with an average grade of 0.068 mg / m$^3$. The temperature used in the production process will also affect the convection and radiation to the temperature rise of the work environment. The working environment temperature ranges from 31.3 - 36.6 °C which makes the c-silica dust become drier and lighter so it is easily carried by the airflow present in the work environment and can expand the spread of the dust. Silicosis is still present in workers who die affected by exposure to silica dust between 0.05 - 0.1 mg / m$^3$. From the result of the measurement of c-silica dust in the working environment by using personal sampler on each respondent got result that exceeds limit value based on Indonesia regulation (Ministry of Manpower and Transmigration No. PER.13 / MEN / X / 2011) amounted to 55.3%. The value of concentration is very influential on the value of intake in workers the higher the concentration of dust c-silica in the work environment the higher the value of the intake so that the value of risk will also increase$^{11}$.

Chest radiography can be used to assess the exposure of silica dust. The interpretation of the results of a thorax examination should be done using the radiographs of pneumoconiosis guidance from the ILO$^{13}$. Based on the calculation of risk values over the next 20 years based on table 2 there is an increased risk. This happens because exposure to c-silica dust is prolonged even further if not effectively controlled$^{16}$.

**CONCLUSION**

From this study it can be concluded that 42.6% of respondents mempuyai unsafe risk level of exposure to c-silica dust so potentially health problems due to exposure to c-silica dust. Based on the estimated calculation of chronic exposure risk, the risk level tends to increase to the next 20 years.

**Conflict of Interest:** None

**Source of Funding:** Self

**Ethical Clearance:** This study was approved by Health Research Ethics Committee, Faculty of Public Health, Airlangga University

**REFERENCE**


on the evaluation of carcinogenic risks to humans / World Health Organization, International Agency for Research on Cancer, 68, hal. 1–475.


Central Obesity as a Risk Factor for Hypertension in Women: in Bogor District

Melly Kristanti1, Helda2

1Master Program in Public Health, Faculty of Public Health, University Indonesia, Campus of Depok, West Java, Indonesia, 2Department of Epidemiology, Faculty of Public Health, University Indonesia, Campus of Depok, West Java, Indonesia

ABSTRACT

Hypertension in women is increased by 30.9% and 26.6% of central obesity in Indonesia. The purpose of this study is to study the relationship of central obesity with hypertension in women aged 18 years and over in Bogor District year 2016. This study used cross sectional design with cox regression analysis. The analysis is used to see how much impact of Central Obesity with hypertension incidence after backward elimination procedure test. Total sample in this study was 525 samples. Results from this study showed an influence of age > 45 years on the association of central obesity with hypertension in women with a PR of 1:56 (95% CI 1084-2120) and the discovery of potentially confounding variables which is age. The risk of central obesity with hypertension increased after controlled by age as much as PR 1:52 (95% CI 1:07 to 2:16). Central obesity affects the incidence of hypertension in women. It is suggested that all women to increase physical activity, adjusting the diet and conduct regular health checks to maintain the weight to avoid central obesity.

Keywords: Central Obesity, Age, Hypertension, Women, Health

INTRODUCTION

Hypertension is a global public health problem. Hypertension is often called the silent killer, because there was no physical signs of high blood pressure and there is no record of complaints in patients with hypertension.1 According to WHO (World Health Organization) in 2011, 1 billion people worldwide suffer from Hypertension and two thirds of them are from low and middle-income developing countries. Hypertension in women has increased around the world in this decade. Especially in Indonesia, Hypertension in women is higher than in men.2

Hypertension is the latest issue to be considered in the Sustainable Development Goals (SDGs) program. Therefore, there is Presidential Instruction No. 1 of 2017 on Healthy Living Community Movement. The purpose of this movement is to improve prevention and early detection of diseases, especially on Non Contagious Diseases in Indonesia. One way of this GERMAS program is to check blood pressure once every month at POSBINDU in every area of the first health facility in Indonesia.3

Central obesity mechanism for hypertension could lead to unbalanced glucose tolerance. High levels of insulin would circulate and reduce the sensitivity of insulin metabolic activity. These conditions could lead to hyperinsulinemia that affects the rise in blood pressure.4

Measurement of abdominal circumference can be useful for identifying population-based risk that can cause hypertension in adult women. A study revealed that an increase in the occurrence of hypertension is influenced by the increase of abdominal circumference and age in women.5 Another study has also revealed that waist circumference may increase the risk of hypertension. Measurement of waist circumference is one step to prevent the occurrence of hypertension in Asians.6
There are many risk factors which caused hypertension, such as age, gender, smoking habit, physical activity, obesity and central obesity, fruit and vegetable consumption, genetic factors, and stress. Hypertension in women can lead to more serious complications than in men. Therefore there should be hypertension prevention for women, especially in women based on risk factors. In addition, hypertension in menopausal women can contribute to an increase in incidence of hypertension. This incidence has relation to the loss of estrogen and pituitary hormones because they are produced in excess, their weight gain or a combination of other influences. Moreover, in infertile women, there are some who use oral contraceptives. Oral contraceptives could cause sodium buildup, increase fluid volume / plasma, and could increase weight. The use of oral contraceptives with more than (> 50μgr) could cause hypercholesterolemia in women.7

Several studies conducted in Indonesia shows that central obesity has a significant relationship with hypertension in women.8 Other studies also explain that central obesity may increase the risk of hypertension by 1.6 times compared with non-obese central ones.9 Based on the results of the study of Obesity Association of Indonesia in 2004, the prevalence of obesity in women is higher (11:02%) than in men (9:16%).10 Another study conducted in Bogor District in 2007 explained that abdominal circumference is one of the risk factors associated with the incidence of hypertension.11

Bogor District is an area that has a high prevalence of hypertension and central obesity. Prevalence of hypertension in Bogor district is 27.6% while central obesity is 24% in 2013. This study was conducted in Bogor District. However, prevalence of hypertension and central obesity in women aged 18 years and above is not known. Therefore it is necessary to conduct research related to central obesity and hypertension in women in Bogor District.

MATERIALS AND METHOD

This research is a quantitative research with cross sectional study design using secondary data of GERMAS 2016. The data is a data of Bogor District. This design observes and measures the main risk factors (central obesity) and other risk factors (age, physical activity, smoking, total cholesterol, also fruit and vegetable consumption) and the measurement of dependent variables (hypertension) at the same time. The variable in this study is limited to the variables which available in the data GERMAS 2016. Estimated minimum sample in this study is 260 samples which determined by using two sample populations / two tail with a power of 80%. The analysis uses Cox Regression analysis because the prevalence of outcome is more than 10%. Participants rate in this study is 100%. Samples taken were 525 samples.

It is determined as not Central Obesity when the measurement of abdominal circumference in women is < 80 cm and it is Central Obesity if the result > 80 cm.11 The age of respondents is grouped using ROC cut off point value, if Not Risk (<45 years cut off point ROC) and Risk (> 45 years cut off point ROC). The measurement in hypertension variable is conducted when someone has a result of systolic blood pressure ≥140mmHg and or diastolic blood pressure ≥90mmHg. Not hypertension if the systolic blood pressure is < 140mmHg and or tekanan diastolic blood pressure < 90mmHg.12 Physical activity is determined as Enough if the frequency is 3-5 times a week with duration of at least 150 minutes / week. However it is determined as Less activity, if it is less than 3-5 times a week with duration of less than 150 minutes.13 A person who is exposed to secondhand smoke either as an active smokers or as a passive smokers,14 Cholesterol levels in the blood, if the total cholesterol level > 200 mg / dL it is high whereas the total cholesterol level <200mg / dL it is low 15 and the average consumption of fruit and vegetable intake > 5 servings per day.16

RESULTS

In this study a multivariate cox regression analysis was used to examine the relationship between central obesity and hypertension occurrence in women aged 18 years and over after controlled with age, total cholesterol, physical activity, fruit and vegetable consumption and smoking. In Table 1 from 525 respondents, 49.71% women aged 18 years and over suffered from hypertension while 50.29% had normal blood pressure. In addition, women who are central obesity is recorded at 77.33% whereas there are 22.67% of those women who is not central obesity. Percentage of female respondents by age group 46-55 years at most is 29.71%. The percentage of women whose physical activity is less is 66.67% compared with the physical activity which is enough has 33.33%, the percentage of women who are active smokers or passive smokers exposed by
cigarette smoke is lower at 48.57% than unexposed or non-smokers at 51.43%, the percentage of women who consumed less fruits and vegetables is lower which is 48.57% compared with women who consumed enough fruits and vegetables has 51.43%, and the percentage of women which has a high cholesterol levels is lower at 30.67% compared with the percentage of women who have low cholesterol levels which is 69.33%.

Table 1. Frequency Distribution of Hypertension In Women

<table>
<thead>
<tr>
<th>Variabel</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hipertensi</td>
<td>261</td>
<td>49,71</td>
</tr>
<tr>
<td>Normal</td>
<td>264</td>
<td>50,29</td>
</tr>
<tr>
<td>Central Obesity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Obesity</td>
<td>406</td>
<td>77,33</td>
</tr>
<tr>
<td>Normal</td>
<td>119</td>
<td>22,67</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25</td>
<td>26</td>
<td>4,95</td>
</tr>
<tr>
<td>26-35</td>
<td>84</td>
<td>16</td>
</tr>
<tr>
<td>36-45</td>
<td>145</td>
<td>27,62</td>
</tr>
<tr>
<td>46 – 55</td>
<td>156</td>
<td>29,71</td>
</tr>
<tr>
<td>56-65</td>
<td>82</td>
<td>15,62</td>
</tr>
<tr>
<td>&gt;65</td>
<td>32</td>
<td>6,10</td>
</tr>
<tr>
<td>Physical activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>350</td>
<td>66,67</td>
</tr>
<tr>
<td>Enough</td>
<td>175</td>
<td>33,33</td>
</tr>
<tr>
<td>Smoke</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>255</td>
<td>48,57</td>
</tr>
<tr>
<td>No</td>
<td>270</td>
<td>51,43</td>
</tr>
<tr>
<td>Fruit Vegetable Consumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>255</td>
<td>48,57</td>
</tr>
<tr>
<td>Enough</td>
<td>270</td>
<td>51,43</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>161</td>
<td>30,67</td>
</tr>
<tr>
<td>Low</td>
<td>364</td>
<td>69,33</td>
</tr>
</tbody>
</table>

Based on Table 2, the stratified analysis results shows that age > 45 years is at risk for the occurrence of central obesity with hypertension 1.516 times higher compared with age < 45 years that not has a strong enough risk for the occurrence of central obesity with hypertension. From these results we could say that the age affect central obesity with hypertension. The prevalence of central obese women aged 45 years and over suffer from hypertension is higher at 64.44% compared with the women who is not central obese at 42.86%. Furthermore, in central obese women aged under 45 years suffering from hypertension is higher at 37.58% compared with non-central obesity at 24.29%.

Table 2. StratificationAnalysis Central Obesity with Hypertension Adjusted by Age In Women

<table>
<thead>
<tr>
<th>Variabel</th>
<th>Hypertension</th>
<th>PR (95%CI)</th>
<th>p-value Test homogenity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Obesity</td>
<td>167(64,44)</td>
<td>90(35,02)</td>
<td>1,51 (1,084–2,12)</td>
</tr>
<tr>
<td>Normal</td>
<td>21(42,86)</td>
<td>28(57,14)</td>
<td></td>
</tr>
<tr>
<td>Age &lt; 45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Obesity</td>
<td>56(37,58)</td>
<td>93(62,42)</td>
<td>1,54 (0,97-2,45)</td>
</tr>
<tr>
<td>Normal</td>
<td>17(24,29)</td>
<td>53(75,71)</td>
<td></td>
</tr>
</tbody>
</table>
Based on Table 3 it could be seen the relationship of central obesity with the incidence of hypertension in women after being adjusted with other variables. The risk of central obesity is 1.55 (95% CI 1.09-2.20) times occurrence of hypertension in women after adjusted by age, total cholesterol, smoking, consumption of fruits and vegetables and physical activity. The result shows that age is a confounding variable against the relationship of central obesity with the incidence of hypertension. Where the risk of hypertension is higher in age compared with central obesity, age may increase the risk of occurrence of hypertension in women by 1.69 times.

**Table 3. Association of Central Obesity with Hypertension in Women**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coeff</th>
<th>P</th>
<th>PR</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Obesity*</td>
<td>0.439</td>
<td>0.014</td>
<td>1.55</td>
<td>1.09</td>
<td>2.20</td>
</tr>
<tr>
<td>Age*</td>
<td>0.524</td>
<td>0.000</td>
<td>1.69</td>
<td>1.27</td>
<td>2.23</td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>0.113</td>
<td>0.399</td>
<td>1.12</td>
<td>0.86</td>
<td>1.45</td>
</tr>
<tr>
<td>Smoking</td>
<td>0.215</td>
<td>0.088</td>
<td>1.24</td>
<td>0.96</td>
<td>1.58</td>
</tr>
<tr>
<td>Consumption of fruit and vegetable</td>
<td>-0.136</td>
<td>0.349</td>
<td>0.87</td>
<td>0.65</td>
<td>1.16</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>-0.082</td>
<td>0.607</td>
<td>0.92</td>
<td>0.67</td>
<td>1.26</td>
</tr>
</tbody>
</table>

PR; Prevalens Ratio, CI; Confidence Interval * P <0.0,5 test using multivariate Cox Regression (adjusted by covariate variable: age, total cholesterol, smoking, fruit and vegetable consumption and physical activity).

Based on Table 4, the relationship of central obesity with hypertension at risk of 1.52 (95% CI 1.07-2.16) times greater after controlling it with the age variable. It could be argued that women with central obsessions will develop hypertension as much as 1.52 times greater than those who are not central obesity after being controlled by age. The results of this analysis indicate that there is still a significant relationship between central obesity and hypertension in women after controlled by age.

**Table 4. Final Model of Cox Regression Association Central Obesity with Hypertension In Women**

<table>
<thead>
<tr>
<th>Variable</th>
<th>p-value</th>
<th>PR</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Obesity*</td>
<td>0.017</td>
<td>1.52</td>
<td>1.07</td>
<td>2.16</td>
</tr>
<tr>
<td>Age*</td>
<td>0.000</td>
<td>1.73</td>
<td>1.32</td>
<td>2.28</td>
</tr>
</tbody>
</table>

PR; Prevalens Ratio, CI; Confidence Interval * P <0.0,5 test using multivariate Cox Regression (adjusted by confounding variable: age).

**DISCUSSION**

Analysis has been done to prove the relationship of central obesity with hypertension after controlled with covariate variables. It was revealed that the relationship of central obesity with hypertension has a significant relationship after controlled by confounding variable which is age. The effect of central obesity with hypertension after controlled by risky age was 1.52 (95% CI 1.07-2.16), while the effect of age on the relationship of obesity with hypertension is 1.73 (95% CI 1.32-2.28). The effect of age on the relationship of central obesity with hypertension is higher, therefore age variable is a confounding variable to the relationship of central obesity with hypertension. However, central obesity has a significant relationship with hypertension even before or after controlled by other variables, especially by the age variable. A study conducted by Jenssen explains that an increase in the age of a person, increases the risk when entering the age of 40 years to 59 years, after age of 60 years and over, the incidence of hypertension with central obesity is lower than when entering the age of 40 to 59 years. But these results explain that the increasing size of a person’s abdominal circumference increases the risk of sickness in an aged person.17
According to Poirier, measurement of abdominal circumference can prevent the risk of increased systolic blood pressure and diastolic blood pressure after adjusted by age, sex, BMI and insulin resistance intake. Previous studies have found that abdominal circumference is a major determinant of hypertension. Research conducted in a cohort study by American and Japanese people found that a person whose stomach circumference is at risk can suffer from hypertension with more than 40%. This number is higher when a person with central obesity is exposed to hypertension is women rather than men after being adjusted by age. The abdominal circumference increases with age and higher at older age than younger ones. Increased abdominal circumference is higher in women which is 4.3cm per 15 years.

Research conducted by Snijder explains that age is one of the effect on the relationship of central obesity with the incidence of hypertension, especially in women. Women aged >35 years with central obesity are associated with increased diastolic blood pressure and systolic blood pressure. Excessive abdominal circumference and increasing age is a risk for the occurrence of hypertension. This study proved, that women who are central obesity and at age 45 years has greater risk of hypertension. The risk of central obesity in this study on hypertension after adjusted by age is still quite high.

CONCLUSION

Central obesity affects the incidence of hypertension in women. The older a person is, the greater the risk of hypertension when central obesity. It is suggested that all women to increase physical activity, adjusting their diet and conduct regular health checks to maintain the body weight, so they can avoid central obesity.

Acknowledgment: This research is supported by Grant International Indexed Publication for Student Final Project of University Indonesia (PITTA) and Directorate General of Non-Communicable Disease Control, Ministry of Health of Republic of Indonesia.

Competing Interest: This research is part of final task of University of Indonesia students, thus, there is no competition in conducting this research.

Ethical Clearance: This study was approved by Ethics Commission for Research and Community Service, Faculty of Public Health University Indonesia, with number assignment: 173/UN2.F10/PPM.00.02/2018.

REFERENCES

3. Sardjoko S. Mainstreaming Health in Sustainable Development Goals (SDGs). Konf Nas-7 Promotion of Health; 2017
12. Mancia G, Fagard R, Narkiewicz K, Redán J,


Health Promoting Lifestyle and its Associated Factors among Private University Students in Shah Alam, Selangor

Wan Nurul Fatini Syazwanie Wan Mohd Nazri¹, Hasanain Faisal Ghazi², Maged Elnajeh²

¹Bachelor of Medical Sciences Student, International Medical School, Management and Science University, University Drive, Section 13, 40100 Shah Alam Selangor, Malaysia, ²Senior Lecturer, Community Medicine Unit, International Medical School, Management and Science University, University Drive, Section 13, 40100 Shah Alam Selangor, Malaysia

ABSTRACT

Healthy lifestyle is a major strategy to promote current and subsequent health status. Lifestyle is the way of living of individuals, families, and societies which can be healthy or unhealthy. The objective of the present study was to find out healthy promoting lifestyle level and its associated factors among the private university students in Shah Alam, Malaysia. A cross-sectional study was conducted among 500 students using convenience sampling. Self-administrated questionnaires with 52 items of health promoting lifestyle habits with 6 subscales was used. The results showed that mean score of health promoting lifestyle scale was 136.18 ± 22.48. Half of the respondents found to have normal weight (50.2%) followed by (28.4%) overweight and (12.4%) obese. The association between gender and health promoting lifestyle was significant (P<0.001). While, Body Mass Index was not significantly associated with health promoting lifestyle (P=0.837). As a conclusion, the mean score of healthy lifestyle practice was 136, prevalence of overweight and obese was (40.8%) among university students. More promotion is needed in promoting healthy lifestyle.

Keywords: Healthy promoting lifestyle, obesity, university students.

INTRODUCTION

Healthy lifestyle is a major strategy to promote current and subsequent health status. The aim of this study is to assess the status of health promoting the lifestyle and its determinants among university students. Health promotion is a process for empowerment of individuals in order to improve their health status. The definition of an individual from health is placed in the center of individual viewpoint toward health promoting behaviour. At this level, health is defined as using some positive qualities recommended by World Health Organization. Health is the fulfillment of human potential, maintenance of balance and goal orientation in the environment. Considering the changes happened in the study modes and living in campus dormitories, there is an assumption that many students may experience a wide range of unhealthy habits such as high level of fast food intake, low level of physical activity and irregular sleep, as well. Moreover, the young age of students may lead them to believe that they are in good health, and this would be a possible reason why they are not very conscious of their health behaviours.

Healthy life depends on many factors, including genetics, but certain habits can have a major effect. Health lifestyles are important for health and social identity, yet little is known about their development in early life.

The health habits of university students are a special concern, since they represent a major segment of the young population and they are at a stage of their lives during which important lifestyle modifications take place, high prevalence of risk factors for chronic diseases and poor health-seeking behavior, despite accessibility and affordability to all levels of health care.
Based on Pakseresht et al. 2017 study which measured six domains of health promoting lifestyle by using the 52-item Health Promoting Lifestyle Profile (HPLP II). Convenient sample of 343 students from the University was selected in 2013-14. While girls scored higher in eating habits and health accountability, boys did better in physical activity. However, the scores of all these three dimensions were undesirable in both genders. Conclusion of Health Promoting lifestyle scores were undesirable in university students and significantly related to eating and physical activities. Therefore, there is an urgent need of developing program on healthy lifestyle for them.

The aim of the present study was to find out healthy promoting lifestyle level and its associated factors among the private university students in Shah Alam, Malaysia.

METHODOLOGY

A descriptive, cross-sectional study design is used in this study which was carried out from September 2016 until February 2017 in private university in Shah Alam. The sample size required for this study was 500 respondents. This calculation using the single population mean formula.

A validated self-administrated questionnaire with 52 items was distributed to 500 students. The questionnaire compromised of five sections which are:


Part B: Subscales include Health Responsibility with 9 items, Physical activity with 8 items, Nutrition with 9 items, Spiritual Growth with 9 items, Interpersonal Support with 9 items, and Stress Management with 8 items. Composed of 52 questions in total.

The raw data were checked for any exclusion, legibility and consistency before being coded for analysis. For the purpose of data analysis and hypothesis testing, several statistical tests were applied using the Statistical Package for Social Science (SPSS) version 20.0. Score for overall health promoting lifestyle is calculated by the mean of the 52 items by scoring 1 (never), sometime (2), often (3), routinely (4). The maximum total score for each subscale ranged from 32 to 36 and minimum total score for each subscales ranged 0-18. Respondents independent t-tests, chi square test, one-way anova test were used to identify any statistically significant associations between explanatory independent and outcome variables.

This study has been approved by the International Medical School of the Management and Science University (MSU) Shah Alam. Respondents are entitled to choose freely to participate in the study without any coercion. The respondents were assured that participation in the survey was voluntary and all the information will remain confidential. All participants will be given written informed consent. The participants confidentially details in the questionnaire will be kept secured. Questionnaire will then be collected upon completion.

RESULTS

A total of 500 respondents who participated in this study fulfilled the criteria of inclusions and had answered the given questions with the answer of their choice.

Table 1 shows the frequency of respondents according to the gender of 500 respondents. It show the percentage of male and female was same (50%). The lowest race is India with 148 respondents (29.6%). Body Mass Index (BMI) show half of the respondents is a normal weight (50.2%). Body Mass Index (BMI) show half of the respondents is a normal weight (50.2%).

It shows physical activity is the lowest mean among six subscales with 18.64 ± 4.99. The highest mean of subscales is spiritual growth with 26.88 ± 5.91. The total score is 136.18 ± 22.48 with the maximum of total mean is 191.

Table 3 show the male are overweight and obese with 110 students (44%) compared to the female with 94 students (37.6%). The p value is not significant (p=0.145).

It shows the mean of total score health promoting lifestyle for male is higher than a female with 138.49 ± 23.45 and 133.87 ± 21.25. Moreover, there is association between gender and health promoting lifestyle with p value is significant with (p=0.021). Alternative hypothesis is accepted.

Table 5 show India has the highest mean of health promoting lifestyle among Chinese and Malay with 137.28 ± 21.07. The p value is not significant (p=0.051). There is no association between health promoting lifestyle and race. Null hypothesis is accepted.
DISCUSSION

The main finding of our current study that, the mean score of healthy lifestyle practice was 136 out of 208, prevalence of overweight and obese was (40.8%) among university students.

Our results about healthy lifestyle was better than previous study done in Guangzhou city, mainland China. The mean score for each of the six dimensions was lower than 70. Gender and grade were the factors primarily associated with health-promoting lifestyles among undergraduates. Based on (Motlagh et al. 2011), the overall health-promoting lifestyle profile had a mean of 130.31 ±19). The highest mean in the subscales was 26.03±5.04) for spiritual growth and the lowest was 16.24±4.28) for physical activity. Based on this previous study results, there are the same results according to my current research study which is female students have a lower mean of total score of health promoting lifestyle of female students (136.18 ± 22.48). Also lowest subscales for physical activity (18.64 ± 4.99) with mean of female (17.43) than male (19.86) and the highest subscales also same which is spiritual growth.

Body Mass Index (BMI) in our study showed that half of the respondents is a normal weight (50.2%). Its followed by overweight with 142 respondents (28.4%), and obese with 62 respondents (12.4%). Its show the student of the not have the a good health lifestyle according to a total of the overweight and obese of students is considered high with almost half of the respondents (40.8%). Poor diet and its consequences like obesity is the common healthy problem in urban societies. Unhealthy lifestyle can be measured by BMI. Urban lifestyle leads to the nutrition problems like using fast foods and poor foods, increasing problems like cardiovascular. More promotion and campaign about awareness of obesity is needed to prevent further complication of chronic disease for example diabetes, heart disease, coronary heart disease, heart attack, high blood pressure.

Regarding the race, Indian has the highest mean of health promoting lifestyle among Chinese and Malay with 137.28 ± 21.07. The second highest mean is Chinese with 137.21 ± 24.28. Malay has the lowest mean among the race with 134.29 ± 21.72. It is possible because of the culture and ethnics based on each race and religions. There are no comparison with previous study between health promoting lifestyles and race. But there is a previous study of Religiosity, dietary habit, intake of fruit and vegetable, and vegetarian status among Seventh-Day Adventists in West Malaysia (Tan et al. 2016), Religion has been shown to be salutary on health, and a possible link between religion and positive health outcomes is diet.

Table 1: Socio demographic characteristic of the respondents

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (N)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>250</td>
<td>50.0</td>
</tr>
<tr>
<td>Female</td>
<td>250</td>
<td>50.0</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 – 21 years old</td>
<td>291</td>
<td>58.2</td>
</tr>
<tr>
<td>22 – 26 years old</td>
<td>204</td>
<td>40.8</td>
</tr>
<tr>
<td>&gt;27 years old</td>
<td>5</td>
<td>1.0</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>175</td>
<td>35.0</td>
</tr>
<tr>
<td>Chinese</td>
<td>177</td>
<td>35.4</td>
</tr>
<tr>
<td>India</td>
<td>148</td>
<td>29.6</td>
</tr>
<tr>
<td>Study field</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td>277</td>
<td>55.4</td>
</tr>
<tr>
<td>Non science</td>
<td>233</td>
<td>44.6</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>45</td>
<td>9.0</td>
</tr>
<tr>
<td>Normal</td>
<td>251</td>
<td>50.2</td>
</tr>
<tr>
<td>Overweight</td>
<td>142</td>
<td>28.4</td>
</tr>
<tr>
<td>Obese</td>
<td>62</td>
<td>12.4</td>
</tr>
</tbody>
</table>
Table 2: Subscales of health promoting lifestyle.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health responsibility</td>
<td>10.0</td>
<td>36.0</td>
<td>20.96</td>
</tr>
<tr>
<td>Physical activity</td>
<td>8.0</td>
<td>32.0</td>
<td>18.64</td>
</tr>
<tr>
<td>Nutritional</td>
<td>10.0</td>
<td>36.0</td>
<td>22.45</td>
</tr>
<tr>
<td>Spiritual growth</td>
<td>9.0</td>
<td>36.0</td>
<td>26.88</td>
</tr>
<tr>
<td>Interpersonal relation</td>
<td>12.0</td>
<td>36.0</td>
<td>26.43</td>
</tr>
<tr>
<td>Stress management</td>
<td>9.0</td>
<td>32.0</td>
<td>20.82</td>
</tr>
<tr>
<td>Total score</td>
<td>83.0</td>
<td>191.0</td>
<td>136.18</td>
</tr>
</tbody>
</table>

Table 3: Association between gender and BMI status of the respondents.

<table>
<thead>
<tr>
<th>Body Mass Index</th>
<th>(BMI)</th>
<th>POR</th>
<th>P value</th>
<th>X2</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Overweight and obese</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>140 (56.0)</td>
<td>110 (44.0)</td>
<td>0.767</td>
<td>0.145</td>
<td>2.120</td>
</tr>
<tr>
<td>Female</td>
<td>156 (62.4)</td>
<td>94 (37.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Chi Square test was performed, level of significant at p <0.05

Table 4: Association between gender and health promoting lifestyle.

<table>
<thead>
<tr>
<th>Gender</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Male</td>
<td>Female</td>
<td>P value</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total score health</td>
<td>138.49 ± 23.45</td>
<td>133.87 ± 21.25</td>
<td>0.021*</td>
<td></td>
<td>0.687 – 8.553</td>
</tr>
<tr>
<td>promoting lifestyle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Independent t test was performed, level of significant at p <0.05
Table 5: Association race and between health promoting lifestyle.

<table>
<thead>
<tr>
<th>Race</th>
<th>N</th>
<th>Mean race (SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malay</td>
<td>175</td>
<td>134.29 (21.72)</td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>177</td>
<td>137.21 (24.28)</td>
<td>0.051</td>
</tr>
<tr>
<td>India</td>
<td>148</td>
<td>137.28 (21.07)</td>
<td></td>
</tr>
</tbody>
</table>

*Independent t test was performed, level of significant at p <0.05

CONCLUSION & RECOMMENDATIONS

As a conclusion, the mean score of healthy lifestyle practice was 136, prevalence of overweight and obese was (40.8%) among university students.

In view of the results, the respondents show low of health promoting lifestyle profile especially in physical activity level. On top of that, there was a significant association between gender and health promoting lifestyle. Therefore, more the project recommends plans to elevate the poor healthy lifestyles into control into high awareness and practice of health promoting lifestyle. Aggressive health promotional campaigns and social mobilization by relevant agencies are needed to increase knowledge lifestyle diseases. Emphasis should be placed on the limitations, such as seeking early step to control the lifestyles disease to be serious such as control the fast food intake and obesity. Information, education and communication materials maybe provided in areas like schools or colleges making it more accessible for the residents to obtain. Campaign and promotion of healthy lifestyle is needed. And more the physical activity event among university students recommended. In conclusion, in spite of the study and education and communication programs to identify barriers to action and to control the lifestyle and chronic diseases in future among the university student.

Conflicts of Interest : The authors declare no conflicts of interest

Ethical Clearance: Taken from Management and Science University Ethical Committee.

Source of Funding: Self

REFERENCES

article no. 379, 2009.


Why Don’t Couples Use the Contraceptive That’s Best for Them? Social Determinants of Long Acting and Permanent Contraceptive Method Use in Indonesia

Rita Damayanti¹, Hoirun Nisa¹, Iwan Ariawan¹, Christiana Titaley¹, Dini Dachlia¹, Yunita Wahyuningrum³, Douglas Storey⁴

¹Center for Health Research, Faculty of Public Health, Universitas Indonesia, Depok 16424, Indonesia; ²Department of Public Health, Faculty of Health Sciences, Syarif-Hidayatullah State Islamic University (UIN), Jakarta 15419, Indonesia; ³Johns Hopkins Center for Communication Program, Jakarta, Indonesia; ⁴Department of Health, Behavior and Society, Bloomberg School of Public Health, John Hopkins University, U.S.A.

ABSTRACT

Objectives: To examine social determinants of long acting and permanent contraceptive method (LAPM) use among currently married Indonesian women aged 15 to 49 years.

Method. Data were derived from a cross-sectional study in Tuban, Kediri, and Lumajang District (East Java Province) and Lombok Barat, Lombok Timur, and Sumbawa District (West Nusa Tenggara Province). Information was obtained from 5,930 respondents using a structure questionnaire. We estimated adjusted odds ratios to evaluate for social determinant factors associated with LAPMs use using multivariate logistic regressions.

Results. The prevalence of LAPMs use was 19%. The odds of LAPMs use among women who paid transport cost were higher than that among women who paid none. Similarly, LAPMs use were positively associated with LAPMs availability, encouragement to use LAPMs, perceived distance, knowledge about LAPMs, desire to have no more children, and contraceptive decisions jointly with husbands.

Conclusions. Our findings demonstrate the relatively low level of LAPMs use among currently married Indonesian women, and highlight social determinants that influence women to choose LAPMs. Further studies are warranted to include health provider perspective as well as collecting qualitative data in order to adequately assess behaviors of women associated with LAPMs use.

Keywords. Contraception; Long acting and permanent methods; LAPMs; Family planning

INTRODUCTION

Indonesia’s family planning program was once recognized as one of the most successful programs in the world. However, modern contraceptive prevalence rate (CPR) of 57% among Indonesian couples is lower than its neighbors of South Korea (67%), Vietnam (69%), and Thailand (70%).¹ Study showed that among ever married women in Indonesia who use modern contraceptives, 86% used short acting methods —mostly injectables (60%) and oral contraceptive pills (26%) — whereas only 7% used IUD, 6% used implants, and less than 1% underwent female sterilization.²

A large number of studies have demonstrated high efficacy, acceptability and continuation rates of long-acting and permanent methods (LAPMs).³⁴ In the Contraceptive CHOICE Project in the United States for example, women aged 14-45 years who used long-acting reversible contraception were 21 times less likely to become pregnant than women using short-acting methods like oral contraceptives.³ Furthermore, a total of 77 % of the 7,486 women in the study³ chose a long-acting
and reversible method. At 12 months, women who used long-acting and reversible methods of contraception had higher levels of satisfaction and continuation rates than women who used oral contraception.6

Some studies have highlighted a number of factors related to utilization of LAPMs including healthcare providers,7-9 knowledge about LAPMs,10,11 and joint contraceptive decision with spouse.10,12 Little is known about the factors associated with LAPMs use in the Indonesian context. Understanding more about what may help women select and retain a form of contraception that suits them is particularly important at a time when contraceptive services are being transferred to local authorities.13 Given the particularly low use of LAPMs in Indonesia2, more research is needed to examine factors associated with utilization of LAPMs among currently married women in Indonesia.

**METHOD**

**Study participants**

Data were derived from a cross-sectional study conducted from March to October 2013 in Tuban, Kediri and Lumajang districts (East Java Province) and Lombok Barat, Lombok Timur and Sumbawa districts (West Nusa Tenggara Province). The study was conducted with the approval of the Ethics Committee of Indonesia University Faculty of Public Health, and written informed consent was obtained from all participants. The participants were married women aged 15-49 years. Using a multi-stage cluster design, 50 villages were selected from each district and one neighborhood was randomly selected from each village. In each neighborhood, 40 individuals in East Java and 50 in West Nusa Tenggara were selected randomly for interview. A total of 13,162 women were recruited with participation rate of 97.5%. The present study was based on currently married women who reported using a method of family planning in the previous month before the survey (n=8,503). Out of 8,503 eligible women, we excluded 60 participants who traveled to the contraceptive service provider more than 4 hours and whose contraceptive use was decided by other than spouse. We further excluded 2,453 participants with missing information on the variables we studied. Our final sample for analyses included a total of 5,930 participants.

**Data collection**

Women were interviewed using a structure questionnaire regarding their socioeconomic and demographic characteristics, knowledge and used of family planning, and reproductive history. LAPMs was defined as those methods that prevent pregnancy more than and equal to two years per application (Implants, IUD, male and female sterilizations). Detailed information on LAPMs use was ascertained by asking women the contraception type they had used in the last month prior to the survey. Access to the source of contraception method were assessed by asking respondent’s perception about distance to the service place, transport cost spent for commuting to the service points, and LAPMs availability. The time required to commute to the service place were grouped into quintile to define the perceived distance, and the highest quintile was used as a cut-off point. Perceived distance was near if the time was < 14 minutes, and far if the time was ≥ 15 minutes. Transport cost was defined none if there was no transportation cost needed, while less and more were cut off by mode of amount of money paid for transportation (Rp. 10,000 or USD 0.75). Women were asked regarding the LAPMs availability and whether LAPMs was the most recommended family planning methods. Women assessed whether they satisfied with the family planning services provided in the health care, and the answers were categorized in to three categories: ‘satisfied’, ‘neutral’, and ‘dissatisfied’. Knowledge about contraceptive methods was scored from zero to six, by computing six questions: two about appropriate spacing and limiting methods, and four about long-term LAPMs use (IUD, Implant, female and male sterilization). Desire for children were classified as wanted if the woman reported having wanted to become pregnant, undecided if she was not sure of having wanted to become pregnant, and wanted no more if she did not want to get pregnant. Woman was asked about who decided for her to use the contraception, and the answers were categorized into “herself” if she had an autonomy to decide, “husband” if she did not have an autonomy, and “joint with husband” if they discussed and decided together on contraception use.

**STATISTICAL ANALYSIS**

Associations between LAPMs use and selected social determinants of contraception among currently married woman were examined in terms of odds ratio
and 95% confidence interval, which were obtained from logistic regression analysis. Statistical adjustment was made for age (mean), education level (not complete primary, complete primary, and complete secondary and higher), residence area, wealth index (poor, middle, and rich), and parity (nulliparous, primiparous, and multiparous). A two-sided \( P \)-value <0.05 was considered as statistically significant. Statistical analyses were calculated using SPSS software (SPSS, Inc., version 15).

**RESULTS**

Nineteen percent of currently married woman participated in the present study chose one of the three LAPMs (7.8% implant, 7.6% IUD, and 3.5% female sterilization). More than half of women were not able to correctly answer three out of six questions regarding contraceptive methods (Figure 1). Only 47% of women mentioned LAPMs as appropriate for limiting childbirth, whereas 78% identified injectables and oral pills as appropriate spacing methods. In addition, only a few women understood male and female sterilization as LAMPs, the proportions were 29% and 39%, respectively (data not shown).

We further examined associations between LAPMs use and selected social determinants of contraception among currently married women (Table 1). The odds of LAPMs use among women who paid transport cost for commuting to service point were markedly higher than that among women who paid none. Similarly, there were significant positive associations of LAPMs availability, encouragement to use LAPMs, perceived distance, and knowledge about LAPMs with LAPMs use among currently married women. Conversely, women who satisfied with provider service had significantly lower odds of LAPMs use relative to women who were not satisfied. The odds of LAPMs use in women who did not want more children were significantly higher compared to those women who did. Moreover, women who made contraceptive decisions jointly with their husbands had a higher odds of LAPMs use compared with women who made decisions alone.

**Table 1. Associations between social determinants of contraception and LAPMs use among currently married Indonesian woman.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>( n ^ \times ) (%)</th>
<th>OR (95% CI) (^\dagger)</th>
<th>OR (95% CI) (^\ddagger)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived distance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Near</td>
<td>1901 (32.1)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Far</td>
<td>4029 (67.9)</td>
<td>2.74 (2.32-3.24)</td>
<td>2.72 (2.29-3.24)</td>
</tr>
<tr>
<td>Transport cost, Rupiah</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1897 (32.0)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Cheap</td>
<td>3025 (51.0)</td>
<td>1.92 (1.61-2.30)</td>
<td>1.86 (1.54-2.24)</td>
</tr>
<tr>
<td>Expensive</td>
<td>1008 (17.0)</td>
<td>5.86 (4.81-7.14)</td>
<td>5.57 (4.53-6.86)</td>
</tr>
<tr>
<td>LAPMs availability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not available</td>
<td>1615 (27.2)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Available</td>
<td>4315 (72.8)</td>
<td>5.26 (4.20-6.59)</td>
<td>4.38 (3.47-5.53)</td>
</tr>
<tr>
<td>Encouragement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short acting LAPMs</td>
<td>3554 (59.9)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>LAPMs</td>
<td>2376 (40.1)</td>
<td>4.15 (3.60-4.78)</td>
<td>3.75 (3.24-4.35)</td>
</tr>
<tr>
<td>Satisfied with provider service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>39 (0.6)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Neutral</td>
<td>271 (4.6)</td>
<td>0.27 (0.13-0.58)</td>
<td>0.29 (0.14-0.63)</td>
</tr>
<tr>
<td>Satisfied</td>
<td>5620 (94.8)</td>
<td>0.44 (0.23-0.86)</td>
<td>0.46 (0.23-0.91)</td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor (&lt;4)</td>
<td>3057 (51.5)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Good (≥4)</td>
<td>2873 (48.5)</td>
<td>2.56 (2.23-2.94)</td>
<td>2.19 (1.89-2.53)</td>
</tr>
</tbody>
</table>
In the present study the low use of LAPMs (19%) among currently married Indonesian women was similar with the previous findings showing that LAPMs were the least utilized methods of contraception. Results from the study in three regions including Asia have suggested that the limited use of LAPMs was driven primarily by a more substantial role in the provision of short-acting methods other than LAPMs. In addition, the present findings also implies a significant effect of methods availability on LAPMs use. One study showed an increased in modern contraceptive use across 113 countries when more methods were available to a large portion of the population. Interestingly, it is likely that financial matter, such as transport cost, was taken in to account when participants decided to use LAPMs. Furthermore, greater distance to the service provider (measured in relation to travel time) tended to promote greater odds of LAPMs use. Use levels for IUDs and female sterilization that were dependent on travel to clinics rise as travel time increases among currently married women in the Philippines.

In Indonesia midwives are the main providers of contraception since the Village Midwife Program was introduced in 1989 by the government. The program’s primary goals were not only to improve the use of family planning services but also to enhance the mix of contraceptive products available to target populations. As previously noted, the village midwives in Indonesia influenced women to switch from pills to injectable contraceptives as opposed to switching to LAPMs. The relatively infrequent use of LAPMs may indicate the midwives in Indonesia have not been effectively advocated for these methods of contraception. Therefore, it was likely that women in the present study addressed only the quality of short-acting contraception methods served by the health care provider since LAPMs were not commonly used in Indonesia.

Knowledge of different contraceptive methods is an important factor in a woman’s choice of LAPMs. The present findings were in line with previous studies showing that the low use of LAPMs were attributed to women’s lack of knowledge as well as their misperceptions about the methods. The findings from a study among young women aged 15-24 years showed that one third of women had a lack of knowledge about IUD-related amenorrhea and they would not use the IUD.

In the present study, an increased use of LAPMs associated with desire for no more children was consistent with findings from the previous studies. Interestingly, the joint contraceptive decision-making with husband had also increased the LAPMs use even though less than half (42.3%) of women received support from their husbands to use LAPMS. This suggests that...
there is a need of increasing spousal communication on family planning, particularly on the LAPMs use. Although men were reported as less involved in deciding which method to use and showed reluctance to discuss about contraception, the importance of communication between spouses regarding the LAPMs use have been emphasized in these studies.10,12

Advantages in the present study were the large size of the study population, systematic consideration of important social determinants of contraception, and the high participation rate (97.5%). However, information about family planning collected only from married women in reproductive age was a limitation in the present study. In addition, we could not establish a cause-effect relationship between the social determinant factors of contraception and LAPMs use due to its cross-sectional design. We attempted to control for potential confounders of known factors in the multivariable analysis.

CONCLUSION

We concluded that in order to increase the uptake of LAPMs, more actions should be taken by encouraging women to choose LAPMs, discussion between partners about LAPMs, and improving women’s knowledge about LAPMs. We suggest that further studies could include health provider perspective to understand determinant of LAPMs use as well as collecting qualitative data in order to adequately assess behaviors of women associated with LAPMs use.

Source of Funding: This study was funded by USAID and the Australian Department of Foreign Affairs and Trade (DFAT).

Competing Interests: The authors declare that they have no competing interests.

REFERENCES

14. Eeckhaut MC, Sweeney MM, Gipson JD. Who is using long-acting reversible contraceptive methods?


Correlation of Protein Tyrosine Kinase with Thyroid Hormones in Type 2 Diabetes Mellitus Patients and those with Diabetic Nephropathy Iraqi Patients

Zainab Mahdi Abed Al-Khdhairi1, Bushra H. Ali1

1College of Education for Pure Sciences (Ibn–Al-Haitham)/ University of Baghdad, Iraq

ABSTRACT

Diabetes mellitus is a metabolic disorder categorized hyperglycemia resulting from defects in insulin secretion, insulin action or both. Protein tyrosine kinase (PTK) is an enzyme that catalyzes the transfer of phosphate groups from ATP to the tyrosine residues of many important proteins resulting in proteins phosphorylation. The aim of current study was to evaluate serum levels of protein tyrosine kinase enzyme and thyroid hormone (T3, T4 and TSH) and to find the correlation between them in type 2 diabetes mellitus and diabetic nephropathy Iraqi patients. Methods: This study was conducted at The National Diabetes Center, Al-Mustansiriya University, Baghdad, Iraq and included 150 patients divided into three groups the first group included 50 Iraqi patients newly diagnosis with type 2 diabetic, as group2, the other group included 50 patients with diabetic nephropathy as group3, and the last group included 50 healthy subjects as controls. as group1. The period of time for collection of blood samples extended from July to October 2017. All patients were between 18 and 60 years old. Results: The results of current study showed that the mean±SD levels of serum T3 in G3 was 1.77±0.19ng/mL and in G2 was 1.67±0.2ng/mL; whereas in G1 was 1.69±0.23ng/mL (P>0.05). On the other hand, the mean±SD levels of serum T4 were 8.99±0.58ng/mL, 8.84±0.69ng/mL and 8.55±0.81ng/mL in the G3, G2 and G1 groups, respectively, (P< 0.001). In addition, the mean±SD levels of serum TSH were 2.61±0.34µIU/ml, 2.5±0.31µIU/ml and 2.52±0.44µIU/ml in the three groups, respectively, (P< 0.001). Moreover, the mean serum levels of tyrosine kinase were 15.2ng/mL, 21.19ng/mL and 8.86ng/mL in the three groups, respectively, (P< 0.001). Correlation study revealed non-significant positive correlation between tyrosine kinase and T3 in G1 and G2 (r= +0.200, r= +0.068, respectively, (P>0.05) while non-significant negative correlation existed between tyrosine kinase and T3 in G3 (r =-0.154) (P>0.05). Non-significant negative correlation was observed between tyrosine kinase and T4 in G1(r= -0.014) (P>0.05). In addition, non-significant positive correlation was observed between tyrosine kinase and T4 in G2 and G3 (r =+0.178, r =+0.073, respectively) (P>0.05).

Keywords: Iraqi patients; diabetic protein tyrosine kinase, Type 2 diabetes mellitus, diabetic nephropathy, thyroid hormones, TSH, protein tyrosine kinase.

INTRODUCTION

Diabetes mellitus is a metabolic disorder categorized hyperglycemia resulting from defects in insulin secretion, insulin action or both [1]. Signs of hyperglycemia often include polyuria, polydipsia, weight loss, polyphagia and disturbed vision [2]. Chronic symptoms of diabetes include micro vascular and macro vascular complications that lead to visual damage, blindness, renal dysfunction, neuropathy, amputation, heart illness and stroke [3]. Types of diabetes include type1, type 2 and gestational diabetes. The classification and diagnosis of diabetes were established by the National Diabetes Data Group (NDDG) published in 1979 [4]. Diabetic nephropathy can be defined as one of the most important long-term complications regarding morbidity and mortality in diabetics. The clinical syndrome of this disease is recognized by continual albuminuria, developmental decrease in the glomerular filtration rate (GFR) and increased arterial blood pressure [5]. Protein tyrosine kinase (PTK) is an enzyme that catalyzes the transfer of phosphate groups from ATP to the tyrosine residues of many important proteins,
making proteins phosphorylation, transferring signal for regulating cell growth, differentiation, death and a series of physiological and biochemical processes. Tyrosine kinases can be classified in two groups: Receptor tyrosine kinase and Non–receptor (cytoplasmic) tyrosine kinases.

Thyroid gland is the largest endocrine gland existing in all vertebrates located in the anterior side of the neck just below the larynx. It is composed of two lateral lobes connected by “thyroid isthmus”, therefore a third lobe in front of the larynx named a pyramidal lobe. In adults, thyroid gland weighs (18-60gm) and increases in size during pregnancy, so that two hormones triiodothyronine (T₃) and thyroxine (T₄) are considered the essential hormones. Both of these hormones play crucial role in several functions, including: “control of body temperature, blood pressure, growth, brain development and metabolism”. Calcitonin is a hormone plays vital role in calcium metabolism secreted by parathyroid glands which have very close anatomical association with the thyroid gland.

**MATERIALS AND METHOD**

This study was conducted in The National Diabetes Center, Al-Mustansiriya University, Baghdad, Iraq. It involved 150 Iraqi patients divided into three groups. The first group contained 50 newly diagnosis type 2 diabetic patients (G2), the second group contained 50 patients with diabetic nephropathy (G3) and the last group contained 50 healthy individuals as controls (G1). Collection of samples for the study extended from July to October, 2017. All patients were between 18 and 60 years old. Exclusion criteria included alcoholic patients, hypertensive, acute illness or infection at time of sampling. Blood sampling was performed at 8.00-10.00 a.m. in the fasting state for all subjects, 3ml of blood was put in plan tube for centrifugation at 3500 rpm for 5 minutes. Then, the serum was used to measure other parameter by ELISA method (T₃, T₄, TSH and tyrosine kinase). Measurement of the parameter by ELISA method depended on The quantitative Sandwich enzyme immunoassay technique to terminate T₃, T₄ and TSH from CUSABUO China also the same for tyrosine kinase activity using protein tyrosine kinase ELISA kit - (SHANGHAI China).

**STATISTICAL ANALYSIS**

Results were expressed as Mean ± SD. Statistical analysis was done by ANOVA to compare between the three studied groups. Also every pair of studied groups was analyzed by post hoc test variation which was considered significant when P≤ 0.05.

**RESULT**

The results of current study showed that the mean±SD levels of serum T₃ in diabetic nephropathy group (G3) was 1.77±0.19ng/mL and in the newly diagnosed diabetes patients (G2) was 1.67±0.2ng/mL; whereas in control group (G1) was 1.69±0.23ng/mL (P<0.05; Table 1 and Figure 1). On the other hand, the mean±SD levels of serum T₄ were 8.99±0.58ng/mL, 8.84±0.69ng/mL and 8.55±0.81ng/mL in the G3, G2 and G1 groups, respectively, (P< 0.001; Table 1 and Figure 2). In addition, the mean±SD levels of serum TSH were 2.61±0.34µIU/ml, 2.5±0.31µIU/ml and 2.52±0.44µIU/ml in the three groups, respectively, (P< 0.001; Table 1 and Figure3). Moreover, the mean serum levels of tyrosine kinase were 15.2ng/mL, 21.19ng/mL and 8.86 ng/mL in the three groups, respectively, (P< 0.001; Table 1 and Figure 4). Correlation study as shown in the Table (2) revealed non- significant positive correlation between tyrosine kinase and T₃ in G1 and G2 (r= +0.200, r= +0.068, respectively, (P>0.05; Figures 5&6), while non-significant negative correlation existed between tyrosine kinase and T₃ in G3 (r =-0.154) (P>0.05; Figure not shown). Non-significant negative correlation was observed between tyrosine kinase and T₄ in G1(r= -0.014) (P>0.05; Figure not shown). In addition, non-significant positive correlation was observed between tyrosine kinase and T₃ in G2 and G3 (r =+0.178, r= +0.073, respectively) (P>0.05; Figures not shown). Non-significant negative correlation was observed between tyrosine kinase and TSH in G1 and G2 (r =+0.178, r= +0.073, respectively) (P>0.05; Figures not shown). On the other hand, non-significant positive correlation existed between tyrosine kinase and TSH in G3 (r =+0.009) (P>0.05; Figure not shown).
Table 1 Comparison of different parameters among the three studied groups by ANOVA and Post hoc test

<table>
<thead>
<tr>
<th>Parameters</th>
<th>G1 (n=50)</th>
<th>G2 (n=50)</th>
<th>G3 (n=50)</th>
<th>P-value</th>
<th>G2 vs. G1</th>
<th>G3 vs. G1</th>
<th>G3 vs. G2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3 (ng/mL)</td>
<td>1.69±0.23</td>
<td>1.67±0.2</td>
<td>1.77±0.19</td>
<td>S</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>T4 (ng/mL)</td>
<td>8.55±0.81</td>
<td>8.84±0.69</td>
<td>8.99±0.58</td>
<td>HS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>TSH (µIU/ml)</td>
<td>2.52±0.44</td>
<td>2.5±0.31</td>
<td>2.61±0.34</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Tyrosine (ng/mL)</td>
<td>8.86±0.84</td>
<td>21.19±0.53</td>
<td>15.2±0.28</td>
<td>HS</td>
<td>HS</td>
<td>HS</td>
<td>HS</td>
</tr>
</tbody>
</table>

HS=highly significant where P<0.001, S=significant where P≤0.05, NS=Non-significant where P>0.05.

G1: Healthy group.
G2: Newly diagnosed patients with type 2 diabetes mellitus.
G3: Diabetes nephropathy patients.

Table 2 Correlation coefficients of tyrosine kinase with T₃, T₄ and TSH levels in studied groups

<table>
<thead>
<tr>
<th>Correlation parameters</th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G1</td>
<td>G2</td>
<td>G3</td>
</tr>
<tr>
<td></td>
<td>r</td>
<td>p</td>
<td>r</td>
</tr>
<tr>
<td>Tyrosine vs. T₃</td>
<td>0.200</td>
<td>NS</td>
<td>0.068</td>
</tr>
<tr>
<td>Tyrosine vs. T₄</td>
<td>-0.014</td>
<td>NS</td>
<td>0.178</td>
</tr>
<tr>
<td>Tyrosine vs. TSH</td>
<td>-0.214</td>
<td>NS</td>
<td>-0.256</td>
</tr>
</tbody>
</table>

NS=Not-significant where P>0.05

Figure 1 Mean levels of serum T₃ (ng/mL) in all studied groups.

Figure 2 Mean levels of serum T₄ (ng/mL) in all studied groups.
DISCUSSION

The results of current study revealed low serum T3 which may be due to reduced peripheral conversion of thyroxin (T4) to tri-iodothyronine (T3) via 5’monodeiodination [11]. These results were in agreement with [12,13], but in contrast with [14] who reported elevated level T3 in type 2 diabetes mellitus. In addition, our results were in contrast with [12] in that they reported low levels of T3 hormone in diabetic patients. Moreover, our data were in agreement with [15] who reported elevated level T3 due to marked hyperglycemia resulting in reversible decrease of activity and hepatic concentration of T4/3 deiodinase causing decreased serum concentrations of T3 and increased levels of T4. In addition, DM is associated with elevated levels of insulin and C-peptide so the effect of insulin as an anabolic hormone known to increase TSH turnover while C-peptide has been shown to increase Na+/K+ATPase efficiency and to increase protein synthesis. The latter might induce an elevation in the level of TSH. At the same time, stress was associated with DM and leads to changes in the hypothalamus- anterior pituitary axis in diabetics such as the presence of subclinical hypo or hyperthyroidism resulting from thyroid axis disorders [15]. On the other hand, the results of TSH were in agreement with [16] who showed that TSH levels in diabetics were significantly lower than in non–diabetics due to “in diabetic there is influence of endocrine and non-endocrine organs other than pancreas”. There are alterations in the hypothalamus-pituitary-thyroid axis. These include reductions in hypothalamic and plasma TRH, pituitary and plasma TSH as well as TSH secretion rates. Also, the TSH response to TRH is decreased.

Data from current study showed an increase in serum TSH levels in G3 due to nephropathy which affects both hypothalamus-pituitary thyroid axis and thyroid hormone peripheral metabolism. Also, uremia influences the function and size of thyroid gland [17].

The level of protein tyrosine kinase was elevated in diabetes mellitus type 2 and diabetic nephropathy patients enrolled in current study. These results were agreement with a pervious study [18]. This difference among the groups may be due to treatment of patients in group G3 with a long duration of disease while G2 patients were newly diagnosed. As a result, the levels of tyrosine kinase were increased in G2 as compared with G3. Another study suggested that insulin is a peptide
hormone that maintains normal levels of glucose in blood and regulates carbohydrate, lipids and protein metabolism. Low insulin levels increase the production of glucose by raising hepatic gluconeogenesis and glycogenolysis in the fasting state. Glucagon stimulates gluconeogenesis and glycogenolysis. Type 2 DM is a heterogeneous group of disorders that is characterized by insulin resistance and impaired secretion with high levels of glucose production. Insulin binding to its receptor results in receptor activation and the recruitment of a family of downstream signaling molecules. Activation of phosphoinositide-3-kinase (PI-3K) through binding to phosphorylated Insulin receptor substrate (IRS) is a critical step in the translocation of glucose transporters to the cell membrane to facilitate glucose uptake.

Ethical Clearance: It was obtained from the Scientific Research Committee at Al-Mustansiriya University, Baghdad, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

REFERENCES


The Effects of Titanium Dioxide Nanoparticles on Salivary LDH Activity; Kinetic Study

Eaman A Al-Rubaee¹, Zainab A Salman², Nagham Q Ragheb³
¹Professor, Biochemistry, ²Assistant lecture, Biochemistry, ³Biological, Basic Science Dep./College of Dentistry/University of Baghdad, Iraq.

ABSTRACT

Background: Enzyme activities can be utilized as good indicators for diagnostic purposes. Thus, determination of kinetic parameters of the target enzymes facilitates the interpretation of the effect that may be occurred on activities of the studied enzymes. The aim of this study was to determine of Vmax and Km of salivary lactate dehydrogenase (LDH) enzyme in presence and absence of the titanium dioxide nanoparticles (TiO₂ NPs).

Methods: The structural properties of (TiO₂ NPs) have been determined using UV-Vis spectrophotometer and SEM. TiO₂ NPs and sharp round peaks around 220nm with a spherical shape and average particle size <50 nm. Results: Km and Vmax values of LDH in absence and presence of TiO₂ NPs were found to be 0.02mmol/L, 15.6U/L and 0.01mmol/L, 17.2U/L, respectively. Conclusion: our results confirmed the activating effects of TiO₂ NPs on salivary LDH activity. The effects of TiO₂ NPs on salivary LDH activity may be due to the activity of this NPs type and/ or the conformational changes that can be occurred on the protein structure of the enzyme after interaction with these NPs.

Keywords: TiO₂ nanoparticles, LDH activity, saliva, Km, Vmax, kinetic study.

INTRODUCTION

In the recent years nanomaterials unfolded and took part in many fields, like electronics, optics, cosmetics and food industries. Nanomaterials were too used in diagnostics and medicine. This intense excess of developed production and use of nanomaterials has led to explore their potential health benefits, and the nanotoxicology is a field well customary [1-4]. In present years, metal oxide nanoparticles have been mainly examined for their antimicrobial activities, especially titanium dioxide (TiO2) which is considered a clean photo catalyst, low-cost, non-toxic with chemical stability. Titanium dioxide nanoparticles are often consumed as a material for orthopedic implants. TiO2 in powder form is also commonly used as a whitener in toothpastes. About 4.6 million tons of pigmented TiO2 are used yearly, and this number is likely to increase as application continues to rise [5-8]. Studies of the effects of nanoparticles (NPs) from different industry branches on cells and pathways are emerging, and most of the biological effects of NPs seem to be due to their interactions with proteins [9].

Enzymes are biologic polymers that catalyze the chemical reactions that make life potential, with the exception of catalytic RNA molecules or ribozymes, enzymes are proteins [10].

The enzyme Lactate dehydrogenase (LDH) catalyzes the interconversion of lactic and pyruvic acids. It is a hydrogen-transfer enzyme that uses the coenzyme NAD+ as in the following equation:

\[ \text{CH}_3\text{CHOHCOOH} + \text{NAD}^+ \leftrightarrow \text{CH}_3\text{COCOOH} + \text{NADH} + \text{H}^+ \]

LDH is widely distributed in the body, mainly in the heart, liver, skeletal muscle, kidney and erythrocytes, and to a lesser extent in the lung, smooth muscle and brain were high LDH activities are originating. Also, higher levels are found in cardiac, skeletal muscles, renal diseases and in some hematologic and neoplastic disorders [11].

Saliva has been used as an indicative fluid in medicine and dentistry. It is simple to collect using non-invasive methods. The intracellular enzymes existent in saliva have been planned as markers of periodontal
diseases. Host responses to periodontal diseases include the production of different enzymes that are secreted by stromal, epithelial or inflammatory cells. There are important enzymes related with cell injury and cell death like ALP. Enzyme revolution activity reflects metabolic variations in the gingiva and periodontium during infection [12,13].

In our former studies, we stated the effect of ZnO NPs on salivary ALP, Peroxidase and AST activities [14-16], effects of AgNPs and AuNPs on salivary LDH activity [11] and effects of TiO2 NPs on salivary ALP activity [5].

Enzyme kinetics is the field of biochemistry interested in measuring the rates of enzyme–catalyzed reactions and the methodical study of issues that impact these rates. A whole stable set of enzyme activities is of fundamental importance for retaining homeostasis. So, appreciation of enzyme kinetics is necessary to understand how physiologic stresses such as anoxia, metabolic acidosis or alkalosis and pharmacologic agents move the balance [17].

There are many previous studies that delt with exact data on the harmful effects of NPs on key mediators of biological functions [11,18,19]. However, there is no study about the effects of TiO2 NPs on LDH activity in saliva. So, this study was designed to explore the effects of these particles on LDH activity in human saliva in vitro.

**MATERIALS AND METHOD**

**Nanoparticles**

TiO2 NPs were obtained from Hongwunanmter, China. This produces articles as TiO2 Nanopowder. Absorbanse spectra of NPs solution were measured by UV-VIS spectrophotometer. All spectra were measured at room temperature in a quartz cell with 1cm optical path. Configuration and nano size measurement of nanoparticles samples were investigated by the Scanning Electron Microscope (SEM) at Electronic Microscope Centre-Collage of applied Science/University of Technology, Baghdad, Iraq.

**Salivary LDH assay**

LDH activity in saliva was spectrophotometrically determined according to the recommendation of the SCE (Scandinavian Committee on Enzymes) HUMAN kit. The reaction mixture confined 1.5mmol/L pyruvate, 0.75mmol/L reduced nicotinamide adenine dinucleotide (NADH), 62.5mmol/L Tris buffer (pH 7.35).

In the existence of LDH (100μL of saliva), pyruvate is compact to lactate with the immediate oxidation of NADH. The rate of reduced in absorbance at 340nm, representing the NADH consumed, is directly balanced to the LDH activity in the sample. For the 1cm path length used, assessment of 6.22 was careful as the NADH millimolar absorptivity. Results were first improved into enzyme activity units (1 unit= 1μmol of NAD+ released per minute) and finally voiced as total LDH activity (units/L) per sample [20].

**Collection of Saliva**

Saliva collection was completed 2-3 hours after volunteers’ usual breakfast time and after carefully washing the mouth with water. Saliva was collected by normal spitting method using a plane tube, centrifuged for10 minute at 1500xg, and the supernatant liquid was used for analysis directly by using a batch of five samples in each trial.

**Effect of TiO2 nanoparticles on salivary LDH activity**

From a stock (300μg/ml) concentration of TiO2 NPs, the following concentrations (0.4, 0.8, 1.3, 1.7, 2.1, 4.2μg/ml) of NPs were ready as a final concentration on the full reaction mixture. The ratio effect on activity was planned by relating the activity with and without the TiO2 NPs and under the same conditions. A constant concentration of TiO2 NPs (4.2μg/ml) were used with different substrates concentrations (0.02, 0.05, 0.09, 0.10, 0.20mmole/L) as a final concentrations in the reaction mixture. Enzyme activities were determined with and without the NPs by using Lineweaver-Burk equation. Apparent Vmax and Apparent Km were evaluated [17].

**RESULTS AND DISCUSSION**

Figure (1) showed the UV-VIS absorption spectra that showed the typical absorbance feature of colloidal solution of TiO2 nanoparticles. The formed nanoparticles showed small and about sharp round peaks around 220nm.
Figure 1 UV-Visible absorbance spectra of the TiO2 nanoparticles.

Figure (2) showed the effects of TiO2NPs (µg/mL) on the LDH (U/L) activity in saliva. It’s clear that the presence of NPs had an activation effect on salivary LDH activity. The greater activation effect by TiO2 NPs on salivary LDH activity was found to be at a concentration of (4.2µg/mL) in the total volume of reaction mixture.

Figure 2 Salivary LDH activities in presence of different concentrations of TiO2 NPs.

Activators stimulate high rates of enzyme-catalyzed reactions by supporting formation of the most active state of the enzyme itself or of other reactants such as the substrate [17]. The effect of TiO2 NPs on salivary peroxidase activity was studied kinetically and the results of current study indicated that salivary peroxidase activated by TiO2 NPs as the Vmax and Km for enzyme activity without nanoparticles were 133.33U/L and 0.133mol/L, respectively; whereas in the presence of TiO2 ,NPs, were 714.3)U/L and 0.357mol/L, respectively.

Figure (3) showed the effects of different volumes of saliva on LDH activity in absence and presence of TiO2 NPs. A volume of 100µL of saliva gave maximum LDH activity in both conditions.

Figure 3 LDH activities with different volumes of saliva in presence and absence of TiO2 nanoparticles.

Among the bisubstrate reactions, essential in clinical enzymology, are the reactions catalyzed by dehydrogenases in which the second substrate is an exact coenzyme, such as NADH. The concentrations of both substrates affect the degrees of two-substrate reactions. Values of Km and Vmax or each substrate are derived from experiments in which the concentration of the first substrate is held at dowsing levels while the concentration of the second substrate is mixed and vice versa [17]. Figure (4) showed the relationship between velocity of reaction (salivary LDH activity) and substrate concentration (NADH) with and without TiO2 NPs. A key factor moving the rate of a reaction catalyzed by an enzyme is the concentration of substrate [S]. Though, studying the effects of substrate concentration is complicated by the detail that [S] changes through the course of an in vitro reaction as substrate is converted to an artifact. Final substrate concentration (0.17mmole/L) was found to be the concentration that gives optimum enzyme activity (20.2 and 17.1U/L) in the presence and absence of TiO2 NPs, respectively.

Figure 4 The effect of substrate concentration on salivary LDH activity with and without TiO2 nanoparticles.

In a previous study [11], biochemical tests revealed that any rise in AgNPs concentration initiated an increase in inhibition, while there was an activation effect of AuNPs on salivary LDH activity and the greater activation was 98% at a concentration of (5.4µg/ml) of AuNPs. Moreover, [22] demonstrated that enough concentration of each of gold, silver, and zinc oxide nanoparticles had an enhancing effect on serum LDH activity as compared with control group in male mice. Many previous studies showed a palpable conformational change when enzyme reacts with NPs. In one of them, ZnO NPs have been detected to vary the secondary structure of lysozyme, also the enzyme keep its catalytic activity and resist to 8M of urea denaturation.
in presence of these NPs [23]. Another study showed that ZnO NPs were competitive inhibitors for salivary ALP and peroxidase activities, while salivary AST activity was enhanced in presence of ZnO NPs [24].

Figure (5) showed the relationship between the $1/v$ and $1/[s]$ on the basis of Lineweaver–Burk equation with and without TiO2 NPs. The Kinetic parameters of Kmapp and Vmaxapp Values, with and without nanoparticles, were found to be 0.01mmol/L, 17.2U/L, 0.02mmol/L, and 15.6U/L, respectively.

**Figure 5** Lineweaver-Burk plot of salivary LDH activity in presence and absence of TiO2 NPs.

Recently, studying the collaboration of proteins with various nanomaterials has developed. The protein corona can define not only how nanoparticles interact with cells, but also their biological effects and toxicity, too. In a previous study, the activation effects of gold and silver nanoparticles on cholinesterase and monoamine oxidase activities were demonstrated [25]. Another study of the effects of gold and silver nanoparticles on the activities of serum AST and ALT enzymes reported inhibitory effects which increased with increasing nanoparticles concentrations [26].

In conclusion, our results confirmed the activating effects of TiO2 NPs on salivary LDH activity. The effects of TiO2 NPs on salivary LDH activity may be due to the activity of this NPs type and/or the conformational changes that can be occurred on the protein structure of the enzyme after interaction with these NPs. Many future studies are needed to understand these effects.

**Ethical Clearance:** It was obtained from the Scientific Research Committee at College of Dentistry/University of Baghdad, Iraq.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**REFERENCES**


24. Kadhim K, Ghudhaib, Leka’a M, Ibrahim , Eaman A, Al-Rubaee,


Lipid Profile in Leukemia and Non-Hodgkin Lymphoma Patients

Jinan Hameed Abu-Shana¹, Ekhlass M.Taha¹, Alaa Fadhil Alwan²
¹Department of Chemistry /College of Science for Women / University of Baghdad/Iraq,
²The national Center of Hematology/ College of Medicine/ Mustansiriyah University, Baghdad, Iraq

ABSTRACT

Background: The high rates of glucose uptake, fueling glycolysis, are now used clinically to identify cancer cells. Therefore, the oncogenes, variable hypoxia levels and the utilization of different carbon sources affect tumor evolution. At the time glucose is regarded as a main source of carbon and energy, there are also lipids. In latest years, researchers were paying attention to studying the role of lipids in different types of malignancies. Decreased blood lipid levels have been observed in various forms of cancer including pancreatic, lung, ovarian and colonic cancers. The aim of current study was to investigate the lipid profile of individuals with hematological malignancies and its relationship to disease activity. Hematological malignancies groups that involved in this study were (Acute myeloid leukemia, acute lymphoid leukemia, chronic myeloid leukemia and chronic myeloid leukemia). Methods: Samples (serum and bone marrow) were obtained from each group to investigate lipid profile (total cholesterol, triglycerides, low-density lipoprotein and very-low lipoprotein). In Acute myeloid leukemia, samples were collected from patients before and after treatment. Results: The results showed that triglycerides and very low-density lipoproteins were significantly increased (P<0.05) when compared to control group in both samples; whereas in acute lymphoid leukemia, they were significantly decreased (P<0.05). Serum and bone marrow lipid profiles in chronic myeloid leukemia and non- Hodgkin lymphoma were significantly high. Conclusion: Based on the finding of this study on Iraq patients, it looked like that lipid profile assessment can be used as a beneficial prognostic factor in leukemia and non-Hodgkin patients. Also, it can be a simple, economical and fast method for following up patients’ responses to chemotherapy

Key words: Cholesterol, triglycerides, low density lipoproteins, leukemia, non-Hodgkin lymphoma.

INTRODUCTION

Lipids are high energy-yielding molecules, so that, they undergo the cancer cells metabolic reprogramming and mutations [1]. The tricarboxylic acid cycle (TCA) enzymes enhance aerobic glycolysis and up-regulate de novo lipid synthesis from acetyl-CoA and the reducing power, NADPH, is required for membrane biogenesis in rapidly dividing cancer cells and glutaminolysis. Modifications are pivotal for the development and maintenance of the malignant phenotype of cancer cells in metastatic sites [2]. Cancer cells adapt their cellular metabolism to cope with their high proliferation rate. Instead of primarily using oxidative phosphorylation (OXPHOS), cancer cells use less efficient glycolysis for the production of ATP and building blocks. This is explained by the effect Warburg which is defined as the phenomenon in which malignant cells yield extra energy through increased oxygen-dependent glycolysis followed by lactic acid fermentation with secretion of lactate. In 1920 Warburg demonstrated that tumor cells exhibited an increased dependence on glycolysis to meet their energy needs, regardless of whether they were well-oxygenated or not. The high rates of glucose uptake, fueling glycolysis, are now used clinically to identify cancer cells. Therefore, the oncogenes, variable hypoxia levels, and the utilization of different carbon sources affect tumor evolution [3]. At the time glucose is regarded as a main source of carbon and energy, there are also lipids. In latest years, researchers were paying attention to studying the role of lipids in different types of malignancies. Decreased blood lipid levels have been observed in various forms of cancer including pancreatic, lung, ovarian and colonic cancers. The abnormality of
lipids has been observed in acute leukemia patients as well, which is defined as a malignant disorder created by clonal expansion of myeloid and lymphoid cells. The reported lipid abnormalities included decreased total cholesterol, elevated triglycerides and changes in the different types of cholesterol [4]. In acute leukemia, the microenvironment provides a number of soluble factors whose primary functions are to boost survival and homing which imply that the apoptotic disorder in leukemia is not cell-autonomous, but highly dependent on outer signals derived from the cellular microenvironment. These complex cell-cell interactions between leukemia blasts and the cells backing them inside the bone marrow (BM) may therefore provide an attractive target for novel drug therapies. The BM microenvironment is known by being rich in cell types, which included (endothelial cells, macrophages, osteoblasts, osteoclasts, fibroblasts and adipocytes). Bone marrow adipose tissue (MAT) accounts for up to 70% of bone marrow volume of the axial skeleton in adult humans. MAT is an energy storage organ and consists mainly of triglycerides which are broken down to release free fatty acids (FFA) to generate ATP. Several previous studies had reported that adipocytes-rich tissues, like bone marrow and the tumor cells, depend on exogenous lipids for regulation of cellular energetics and adaptation to hard metabolic conditions of the metastatic niche. Adipocytes-supplied lipids have ability to alter the metabolic decisions of the cells through regulating glycolysis and respiration, fatty acids oxidation and desaturation of lipids [5]. So far, no enough studies were applied to cover this area. Therefore, the present study was undertaken to examine serum and bone marrow lipid profiles in patients with leukemia and non-Hodgkin’s lymphoma in comparison with age-matched controls.

MATERIALS AND METHOD

Study Design

A prospective study was carried out on (109) leukemia patients who were divided into two groups; the treated group (AML=13, ALL=10) and the untreated group (ALL=15, AML=21 CML=13, NHL=37). These patients were diagnosed and assessed on basis of clinical evaluation, hematology testing, complete blood count (CBC), blood film (B. film), BM aspiration and biopsy at The National Center of Hematology, Baghdad, Iraq. The age range of participants was 30-70 years. Out of them, 20 subjects were controls who were similar to patients in age, sex and race. The donors who had no complaint or any major illness in the recent past were considered healthy and did not have a history of any type of cancer, especially leukemia.

Samples Collection

Blood and bone marrow samples were collected from patients who attended The National Center of Hematology, Baghdad, Iraq. They were fasting and the collected samples (serum and bone marrow) were stored at -20°C.

Estimation of lipid profiles

Samples (serum and bone marrow) levels of triglycerides (TG), total cholesterol (TC), LDL-cholesterol and HDL-cholesterol were determined using spectrophotometer and as follows: Cholesterol was estimated using kits from Bio systems based on CHOD-PAP method, and the triglyceride was assayed using kit from Bio systems which is based on enzymatic colorimetric method with lipid clearing factor. HDL cholesterol was determined by HDL-c precipitation method phosphor tungstate Mg-CHOL oxidase peroxidase. LDL – cholesterol can be calculated mathematically from the total cholesterol, triglycerides and the HDL – cholesterol concentration using Friedwald’s formula:-

\[
\text{LDL-C} = \text{TC} - (\text{HDL-C} + \text{VLDL-C})
\]

And VLDL– cholesterol concentration was calculated as one fifth of the (serum, bone marrow) TG.

Statistical analysis

Computer-based software (the Statistical Package for Social Sciences; SPSS version 25) was used for statistical analyses. Results were presented as mean and standard deviation. Comparisons between groups were performed using Students t-test. P value ≤ 0.05 was considered to be statistically significant.

RESULTS

In the present study, the mean ± standard deviation of lipid levels in the serum and bone marrow of 20 healthy controls and 34 acute myeloid leukemia patients before and after treatment have been reported. The collected data were presented in Table 1. We observed an increment in serum cholesterol, triglycerides and very low density lipoproteins with the observed milled decline in low density lipoproteins. On the other hand,
the follow-up results after treatment showed highly increment in cholesterol, triglycerides, HDL, LDL, VLDL in serum and bone marrow. Broad panoply of lipoproteins and lipid classes is transformed in AML serum and bone marrow, leading to disturbances of various lipid metabolic intermediates of special relation to blast cell counts and prognostic risk.

The same observation has been reported in this study using bone marrow as a sample (Table 1). Also, results of current study showed that bone marrow lipid profiles were significantly increased in all AML patients when compared to controls. This phenomenon probably derived from the irregular fatty acid oxidation in AML patients. Due to the high rate of expansion and metabolism in cancer cells, cholesterol and other intracellular lipids decrease. This may lead to over expression of LDL receptors which causes the serum LDLC to decline \cite{10}, but in the plasma, cholesterol metabolism was altered and markedly increased LDL receptors have also been documented in some malignant cells. These changes appear to be under internal cellular control. Hence, malignant cells appear to differ in their lipid metabolism from normal mature cells. Furthermore, the possibility has been raised that these lipid alterations, and in some cases lipid accumulations, may be intrinsic to cellular proliferation or malignant transformation \cite{11}.

### Table 1 Serum and bone marrow lipid profiles of controls and acute myeloid leukemia (AML) patients

<table>
<thead>
<tr>
<th>Parameter (mg/dl)</th>
<th>Controls (n=20)</th>
<th>AML (n=34)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean±SD</td>
<td>Mean±SD</td>
</tr>
<tr>
<td></td>
<td>Untreated</td>
<td>Treated</td>
</tr>
<tr>
<td></td>
<td>Serum</td>
<td>Bone marrow</td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>95±7.92</td>
<td>101.52±11.02</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>105.02±6.69</td>
<td>110.85±6.43</td>
</tr>
<tr>
<td>HDL-c</td>
<td>14.65±2.41</td>
<td>15.72±1.28</td>
</tr>
<tr>
<td>LDL-c</td>
<td>59.75±8.58</td>
<td>63.63±11.62</td>
</tr>
<tr>
<td>VLDL-c</td>
<td>21.00±1.33</td>
<td>22.17±1.28</td>
</tr>
</tbody>
</table>

* P <0.05

### Table 2 Serum and bone marrow lipid profiles of controls and acute lymphoid leukemia (ALL) patients

<table>
<thead>
<tr>
<th>Parameter (mg/dl)</th>
<th>Controls (n=20)</th>
<th>ALL (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean±SD</td>
<td>Mean±SD</td>
</tr>
<tr>
<td></td>
<td>Untreated</td>
<td>Treated</td>
</tr>
<tr>
<td></td>
<td>Serum</td>
<td>Bone marrow</td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>95±7.92</td>
<td>101.52±11.02</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>105.02±6.69</td>
<td>110.85±6.43</td>
</tr>
<tr>
<td>HDL-c</td>
<td>14.65±2.41</td>
<td>15.72±1.28</td>
</tr>
<tr>
<td>LDL-c</td>
<td>59.75±8.58</td>
<td>63.63±11.62</td>
</tr>
<tr>
<td>VLDL-c</td>
<td>21.00±1.33</td>
<td>22.17±1.28</td>
</tr>
</tbody>
</table>

*P< 0.05
Other groups of leukemia patients have been investigated, which is acute lymphoid leukemia (ALL); Table 2 The results showed an increment in serum cholesterol, triglycerides, and very low density lipoproteins with the observed milled decline in low density lipoprotein in ALL patients when compared to controls.

The same observation has been reported in this study using bone marrow (Table 2).

On the other hand, the follow-up results after treatment showed high increment in cholesterol, TG, HDL, VLDL, and with the observed decline in serum LDL-C levels.

ALL (treated and untreated) bone marrow lipid profile levels were increased except low density lipoprotein was declined. The disturbance in fatty acid oxidation in leukemia patients caused the observed variations in lipid profiles.

<table>
<thead>
<tr>
<th>Parameter (mg/dl)</th>
<th>Controls (n=20)</th>
<th>CML (n=13)</th>
<th>NHL (N=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Serum Mean±SD</td>
<td>Bone marrow Mean±SD</td>
<td>Serum Mean±SD</td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>95±7.92</td>
<td>101.52±11.02</td>
<td>123.49±26.47*</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>105.02±6.69</td>
<td>110.85±6.43</td>
<td>232.04±76.35*</td>
</tr>
<tr>
<td>HDL-c</td>
<td>14.65±2.41</td>
<td>15.72±1.28</td>
<td>42.8±6.01*</td>
</tr>
<tr>
<td>LDL-c</td>
<td>59.75±8.58</td>
<td>63.63±11.62</td>
<td>34.29±16.64*</td>
</tr>
<tr>
<td>VLDL-c</td>
<td>21.00±1.33</td>
<td>22.17±1.28</td>
<td>46.41±15.37*</td>
</tr>
</tbody>
</table>

* P >0.05

Chronic myeloid lymphoid leukemia CML and non-Hodgkin lymphoma NHL patients have been reported in the present study as well, but without following up after treatment. Samples (Serum and bone marrow) lipid profiles were measured in (13) CML, (37) NHL patients and 20 control. The collected data were presented in Table 3. The data showed an increment in serum cholesterol, triglycerides, and the observed significant decrease in LDL-C low density lipoproteins with CML patients when compared to controls. When NHL patients were compared with control subjects, they showed an increase in all lipid profile parameters.

In bone marrow sample for CML, patients showed significant increment in cholesterol, triglycerides, HDL-C and VLDL-C as compared to control subjects; whereas LDL-C showed significant decrement. NHL bone marrow samples had shown an elevation in all lipid profile parameters as compared to controls. As a notable highlight, a dynamic lipid composition of BM is varying according to physiological and pathological situations.

These results were similar to those reported in a studies conducted by [6,7,10].

However, the results of the current study did not agree with other studies conducted by [8,9].

**Conclusion**

Based on the finding of this study on Iraq patients, it looked like that lipid profile assessment can be used as a beneficial prognostic factor in leukemia and non-Hodgkin patients. Also, it can be a simple, economical and fast method for following up patients’ responses to chemotherapy.
Ethical Clearance: It was obtained from the Scientific Research Committee at The National Center of Hematology, Baghdad, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare

REFERENCE


Cellular Immune Response in Children with Viral Chest Infection in Babylon province

Ehsan F. Hussein¹, Ahmed H. Merdas²
¹College of Sciences/ University of Sumer, ²Babylon Health Directorate/AL-Emam Ali Hospital Science

ABSTRACT

Background: The immune system is composed of sophisticated and multifaceted networks of chemicals, proteins, cells, tissues and organs. The innate immunity involves leukocytes with two types; granulocytes (which include neutrophils, eosinophils and basophils) and agranulocytes (which include monocytes and macrophages); whereas the acquired immunity involves lymphocytes with two types; T-cells (mediate cellular immune responses) and B-cells (mediate humoral immune responses). The aim of current study was to evaluate the profile of immune responses in children with respiratory tract infections.

Method: The blood samples from patient children presented with viral chest infection have been collected through the period from January/2018 to April/2018 for the study of several important immune cells which resist this disease type.

Results: The study results were explaining the significant correlations that were found between some of these immune cells in these patients. Significant elevations were presented between lymphocytes in patients children groups and healthy persons groups; whereas no significant increases in the number of other immune cells when compared with same cells types in the study groups.

Keywords: Immune system, lymphocytes, Leukocytes, Viral respiratory tract infection, pediatrics, granulocytes.

INTRODUCTION

The immune system is composed of sophisticated and multifaceted networks of chemicals, proteins, cells, tissues and organs [1]. This system produces protective mechanisms against pathogenic microorganisms such as viruses and these protective mechanisms can be classified into nonspecific (innate immunity) and specific (acquired immunity) [1]. The innate immunity involves leukocytes with two types; granulocytes (which include neutrophils, eosinophils and basophils) and agranulocytes (which include monocytes and macrophages) [2]; whereas the acquired immunity involves lymphocytes with two types; T-cells (mediate cellular immune responses) and B-cells (mediate humoral immune responses) [3].

The respiratory tract infections are most common in children of pre-school and school ages and they include upper respiratory tract infection and associated with several symptoms like cough, sore throat, rhinitis and fever [4]. Epidemiological studies estimates that about 15% of children suffer from frequent respiratory tract infections [5-6].

There are several types of viruses that can cause respiratory tract infections. The most common ones are parainfluenza virus, influenza virus, enterovirus, adenovirus, rhinovirus, coronavirus, human metapneumovirus and respiratory syncytial virus. On the other hand, polyomaviruses and bocavirus are more newly identified causative viruses of the respiratory infections [7]. Respiratory viral infections stimulate accumulation of immune cells in mucosa and sub-mucosa of airways, these immune cells includes lymphocytes, eosinophils, neutrophils and other inflammatory cells [8].

Neutrophils are very prevalent airways leukocytes [9]. The peak response of these cells corresponds with severity of viral infection [10] and occurs within two hours of viral replication [11]. On the other hand, macrophages are monocytes in the circulation and play specific role in controlling immune responses against viral infections [11]. These cells also found within epithelial cells of the airways [12]. The eosinophils have an activity against viral infections [13] and play important roles in inflammatory responses in the airways during viral infections [14]. Moreover, Basophils have important role
in immunity through producing histamine implicated in allergic reactions [3]. The T-lymphocytes are important not only in protection against viral infections, but also they play very important role in the activation of B-lymphocyte for antibodies production [15]. The cell-mediated immunity is divided according according antigen surface expression into (CD+4 T-helper lymphocytes and CD+8 cytotoxic lymphocytes) and both of them have antiviral activity [11]. The aim of current study was to evaluate the profile of immune responses in children with respiratory tract infections

**MATERIAL AND METHOD**

Sampling:

Patients were identified as viral chest infection according to specialized pediatric physician’s opinion.

Blood was withdrawn by a 3-mL syringe from each subject, then transferred to labeled 2-mL EDTA tube and the test results were read by auto analyzer hematology instrument (GENEX COUNT 60; Figure 1).

Counting of the immune cells in the auto analyzer hematology instrument through the electrical resistance for counting that is dependent on measuring the volume of these cells which are present in blood samples.

**Statistical analysis**

Results of this study were resolved using the Statistical Package for Social Science (SPSS) to calculate the Mean, Standard Deviation and Standard Error of Mean. Also, significant differences were tested by One Way Analysis of Variance (ANOVA) LSD 95% at P-value= 0.05) and the significant correlation at (0.05 or 0.01 level 2-tailed) [16].

**Figure 1** Hematology analyzer instrument (GENEX COUNT 60).

**RESULTS**

The results showed an increase in the number of lymphocytes of patients groups as compared with apparently healthy persons group and these and other results were illustrated in the following figures and tables.

**Table 1** Immune cell counts of the apparently healthy participants

<table>
<thead>
<tr>
<th>Study groups</th>
<th>Statistical analysis</th>
<th>¹WBC x10⁹/L</th>
<th>²LYMPH x10⁹/L</th>
<th>³NEUT x10⁹/L</th>
<th>⁴MID x10⁹/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Persons</td>
<td>Mean</td>
<td>7.82</td>
<td>2.22</td>
<td>5.04</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>2.451</td>
<td>0.816</td>
<td>1.621</td>
<td>0.189</td>
</tr>
<tr>
<td></td>
<td>Std. Error of Mean</td>
<td>0.775</td>
<td>0.258</td>
<td>0.512</td>
<td>0.06</td>
</tr>
<tr>
<td>Male Persons</td>
<td>Mean</td>
<td>7.6</td>
<td>2.2</td>
<td>4.86</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>2.625</td>
<td>0.851</td>
<td>1.653</td>
<td>0.207</td>
</tr>
<tr>
<td></td>
<td>Std. Error of Mean</td>
<td>1.174</td>
<td>0.380</td>
<td>0.739</td>
<td>0.092</td>
</tr>
</tbody>
</table>

**Figure 2** Distribution of children (patients group) according to their ages categories.

Figure (2) presented percentages of the patients within the age groups. The age group (1Day-2years) has highest number of patients as it included 62.50%, 37.50% and 50% of the overall number of patients, of male and female patients, respectively.
Table (1) showed the means of all, males and females who were apparently healthy persons. WBC were $7.82 \times 10^9/L$, $7.6 \times 10^9/L$ and $8.04 \times 10^9/L$, respectively, while of the LYMPH were $2.22 \times 10^9/L$, $2.2 \times 10^9/L$ and $2.24 \times 10^9/L$, respectively; whereas of the NEUT were $5.04 \times 10^9/L$, $4.86 \times 10^9/L$ and $5.22 \times 10^9/L$, respectively, and the MID was $0.56 \times 10^9/L$, $0.54 \times 10^9/L$ and $0.58 \times 10^9/L$, respectively.

Table 2 Immune cell counts of children with viral chest infection

<table>
<thead>
<tr>
<th>Study group</th>
<th>Statistical analysis</th>
<th>$^{1}$WBC $\times 10^9/L$</th>
<th>$^{2}$LYMPH $\times 10^9/L$</th>
<th>$^{3}$NEUT $\times 10^9/L$</th>
<th>$^{4}$MID $\times 10^9/L$</th>
</tr>
</thead>
<tbody>
<tr>
<td>All children Patients</td>
<td>Mean</td>
<td>10.531</td>
<td>5.206</td>
<td>6.193</td>
<td>0.768</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>5.053</td>
<td>2.926</td>
<td>7.267</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>Std. Error of Mean</td>
<td>1.263</td>
<td>0.731</td>
<td>1.816</td>
<td>0.082</td>
</tr>
<tr>
<td>Male children Patients</td>
<td>Mean</td>
<td>9.975</td>
<td>5.075</td>
<td>7.387</td>
<td>0.787</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>4.372</td>
<td>2.768</td>
<td>10.147</td>
<td>0.339</td>
</tr>
<tr>
<td></td>
<td>Std. Error of Mean</td>
<td>1.545</td>
<td>0.978</td>
<td>3.587</td>
<td>0.12</td>
</tr>
<tr>
<td>Female children patients</td>
<td>Mean</td>
<td>11.087</td>
<td>5.337</td>
<td>5</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>5.907</td>
<td>3.264</td>
<td>2.636</td>
<td>0.342</td>
</tr>
<tr>
<td></td>
<td>Std. Error of Mean</td>
<td>2.088</td>
<td>1.154</td>
<td>0.932</td>
<td>0.121</td>
</tr>
<tr>
<td>Normal Value</td>
<td></td>
<td>$4.0-11.0$</td>
<td>$0.6-4.1$</td>
<td>$2.0-7.8$</td>
<td>$0.1-1.8$</td>
</tr>
</tbody>
</table>

Table (2) the means of all, males and females who had viral chest infections. WBC were $10.531 \times 10^9/L$, $9.975 \times 10^9/L$ and $11.087 \times 10^9/L$, respectively while LYMPH were $5.206 \times 10^9/L$, $5.075 \times 10^9/L$ and $5.337 \times 10^9/L$, respectively; whereas NEUT were $6.193 \times 10^9/L$, $7.387 \times 10^9/L$ and $5 \times 10^9/L$, respectively, and the MID was $0.768 \times 10^9/L$, $0.787 \times 10^9/L$ and $0.75$ respectively.

Table 3 Comparisons of immune cell counts within study groups according to LSD system

<table>
<thead>
<tr>
<th>Comparison between of the study groups</th>
<th>Statistical Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC=(White Blood Cells)</td>
<td></td>
</tr>
<tr>
<td>The children patients and apparently healthy persons</td>
<td>2.711</td>
</tr>
<tr>
<td>The male children patients and male apparently healthy persons</td>
<td>2.375</td>
</tr>
<tr>
<td>The female children patients and female apparently healthy persons</td>
<td>3.047</td>
</tr>
</tbody>
</table>
**Table 3** Comparisons of immune cell counts within study groups according to LSD system

<table>
<thead>
<tr>
<th>Cell Type</th>
<th>Mean Difference</th>
<th>Standard Error</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lymphocytes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The children patients and apparently healthy persons</td>
<td>2.986**</td>
<td>0.974</td>
<td>0.004*</td>
</tr>
<tr>
<td>The male children patients and male apparently healthy persons</td>
<td>2.875**</td>
<td>1.377</td>
<td>0.042*</td>
</tr>
<tr>
<td>The female children patients and female apparently healthy persons</td>
<td>3.097**</td>
<td>1.377</td>
<td>0.029*</td>
</tr>
<tr>
<td><strong>Neutrophils</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The children patients and apparently healthy persons</td>
<td>1.153</td>
<td>2.383</td>
<td>0.631</td>
</tr>
<tr>
<td>The male children patients and male apparently healthy persons</td>
<td>2.527</td>
<td>3.371</td>
<td>0.457</td>
</tr>
<tr>
<td>The female children patients and female apparently healthy persons</td>
<td>-0.220</td>
<td>3.371</td>
<td>0.948</td>
</tr>
<tr>
<td><strong>MID=(Eosinophils, Basophils and Monocytes)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The children patients and apparently healthy persons</td>
<td>0.208</td>
<td>0.117</td>
<td>0.082</td>
</tr>
<tr>
<td>The male children patients and male apparently healthy persons</td>
<td>0.247</td>
<td>0.166</td>
<td>0.143</td>
</tr>
<tr>
<td>The female children patients and female apparently healthy persons</td>
<td>0.170</td>
<td>0.166</td>
<td>0.312</td>
</tr>
</tbody>
</table>

*The difference is significant at the P value=0.05 level. **The mean difference.

Table (3) the significant differences between all, male and female patients within the group of apparently healthy persons were 0.004, 0.042 and 0.029, respectively, of the lymphocytes, while no significant difference was found between the group of patients and the apparently healthy persons for the white blood cells, neutrophils, eosinophils, basophils and monocytes.

**Table 4** Correlation between leukocyte counts of the study groups

<table>
<thead>
<tr>
<th>Statistical Analysis</th>
<th>All children patients</th>
<th>Male children patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>WBC</strong></td>
<td><strong>LYMPH</strong></td>
</tr>
<tr>
<td></td>
<td><strong>WBC</strong></td>
<td><strong>LYMPH</strong></td>
</tr>
<tr>
<td>WBC</td>
<td>R=0.934**</td>
<td>R=0.660**</td>
</tr>
<tr>
<td></td>
<td>Sig.=0.001</td>
<td>Sig.=0.005</td>
</tr>
<tr>
<td>LYMPH</td>
<td>R=0.660**</td>
<td>R=0.730**</td>
</tr>
<tr>
<td></td>
<td>Sig.=0.005</td>
<td>Sig.=0.001</td>
</tr>
<tr>
<td>NEUT</td>
<td>R=0.623**</td>
<td>R=0.550*</td>
</tr>
<tr>
<td></td>
<td>Sig.=0.010</td>
<td>Sig.=0.027</td>
</tr>
<tr>
<td>MID</td>
<td>R=0.896**</td>
<td>R=0.875**</td>
</tr>
<tr>
<td></td>
<td>Sig.=0.003</td>
<td>Sig.=0.004</td>
</tr>
</tbody>
</table>
Cont.. Table 4 Correlation between leukocytes counts of the study groups

<table>
<thead>
<tr>
<th>Female children patients</th>
<th>WBC</th>
<th>LYMPH</th>
<th>NEUT</th>
<th>MID</th>
</tr>
</thead>
<tbody>
<tr>
<td>R=0.716*</td>
<td>R=0.809*</td>
<td>R=0.782*</td>
<td>R=0.941**</td>
<td></td>
</tr>
<tr>
<td>Sig.=0.046</td>
<td>Sig.=0.015</td>
<td>Sig.=0.022</td>
<td>Sig.=0.001</td>
<td></td>
</tr>
<tr>
<td>R=0.896**</td>
<td>R=0.946*</td>
<td>R=0.821*</td>
<td>R=0.941**</td>
<td></td>
</tr>
<tr>
<td>Sig.=0.003</td>
<td>Sig.=0.001</td>
<td>Sig.=0.012</td>
<td>Sig.=0.001</td>
<td></td>
</tr>
<tr>
<td>R=0.875**</td>
<td>R=0.946**</td>
<td>R=0.405</td>
<td>R=0.413</td>
<td></td>
</tr>
<tr>
<td>Sig.=0.004</td>
<td>Sig.=0.001</td>
<td>Signifi.=0.309</td>
<td>Signifi.=0.309</td>
<td></td>
</tr>
<tr>
<td>R=0.288</td>
<td>R=0.288</td>
<td>R=0.405</td>
<td>R=0.288</td>
<td></td>
</tr>
<tr>
<td>Sig.=0.489</td>
<td>Signifi.=0.489</td>
<td>Signifi.=0.320</td>
<td>Signifi.=0.489</td>
<td></td>
</tr>
</tbody>
</table>

Sig.= Significant. *= Significant correlation at the 0.05 level (2-tailed). **= Significant correlation at the 0.01 level (2-tailed). 1 = White blood cells. 2 = Lymphocytes. 3 = Neutrophils. 4 = Eosinophils, Basophils and Monocytes.

Figure 3 Comparison of white blood cells count between patients and apparently healthy children.

Figure (3) showed an increase in white blood cells count in the age categories (1 day-2 year) and (3 year-5 year) of patients; whereas decreased in the age categories (6 year-8 year) and (9 year-11 year).

Figure 4 Comparison of the white blood cells count between male patients and male apparently healthy children.

Figure (4) showed an increase in white blood cells count in the age categories (1 day-2 year) and (6 year-8 year) of the male patients; whereas they were decreased in the categories (3 year-5 year) and (9 year-11 year).

DISCUSSION

Figure (2) showed the number of patients who were varied according to the age category and the large number of infected children were between the age of 1 day and 2 years. In the study of [17], acute respiratory tract infections decreased with increasing age except the age group of 2-3 years. On the other hand, [18] found that this infection was highest in age < 2 years. There are several factors that affected the incidence of infections in children such as age, gender, prematurity, smoking by parents, size of the family, overcrowding, congenital abnormalities and immunodeficiency [19].

Table (2) explained the increase in the number of the immune cells (White Blood Cell, Neutrophils, Eosinophils, Basophils and Monocytes) of patients groups when compared with those of the healthy persons group (Table 1). Also, the significant increase found in lymphocytes count was only when compared the results between study groups (Table 3; Figures 3&4). The immune responses of the specific T-lymphocytes and B-lymphocytes cells were associated with respiratory viral infections [20].
The innate and acquired immune responses play an important role in clearance of viral respiratory tract [21]. Several types of immune cells have the ability of keeping pulmonary homeostasis during viral respiratory tract infections [22]. Studies in mouse models explained that during the RSV infection macrophages play specific role in intercepting too much T-cells-mediated inflammation by unknown mechanism(s) [23]. In viral infection of the respiratory tract, the cellular immune response (mediated by T-cells) has the capacity to remove viruses from lungs and this occurs within three weeks of the onset in immunocompetent infants [24].

The absolute counts of T-cells during viral infections are inversely related to age and that the T-cells are more proclaimed in younger patients [25]. Children patients who have more severe disease and those need ventilation have decreased T-cells counts (all subsets) in circulation when compared with those who have less severe illness, likewise, the CD4 T-cells and CD8 T-cells are sparse in lung tissue [26,27] and counts of CD8 T-cells increase through the course of sickness [28]. The CD4 Helper T-cells and B-cells have the ability to produce virus-specific immunoglobulins which can remove viruses by two ways; firstly by inactivation, opsonization and neutralization of viruses, and secondly by inducing killing of the infected cells [29].

Table (4) illustrated the presence of correlation between some of the immune cells in the study groups. Monocytes play role in lung inflammation and migrate to the lymph node [30]. These cells have weak activators of the native T-cells; whereas experimentally analyzed during virus infections [30].

**CONCLUSION**

The lymphocytes play the most important role among other leukocytes in immune responses to viral chest infections. The significant differences in lymphocytes count between study groups were 0.004, 0.042 and 0.029 of all, males and females patients, respectively. Also, it was found that the patients within two years ages were more infected, and infectivity of this disease is inversely correlated with increasing of age. In addition, there is an increase in the count of these cells associated with this disease type in comparison with other immune cells.

**Ethical Clearance:** It was obtained from the Scientific Research Committee at Babylon Health Directorate.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**REFERENCES**

11. McNamara PS, Smyth RS. The pathogenesis of


Rebound Increase in Bilirubin Level with its Risk Factors after Treatment by Intensive Phototherapy for Neonatal Hyperbilirubinemia

Zainab W Al-Maaroof1, Wisam Abbas2, Abdulkareem Shatti Al-Jamil2
1Department of Pathology/ Faculty of Medicine/ University of Babylon, Iraq, 2Babylon Teaching Hospital for Maternity and Pediatrics/ Babylon City, Iraq

ABSTRACT

Background: Approximately 60% of term newborns and 80% of preterm newborns develop jaundice in the first week of their lives. The role of intensive phototherapy is of great importance to avoid blood exchange transfusion. Significant bilirubin rebound can occur after intensive phototherapy due to the clinical state and existence of risk factors. The objectives of current study were to detect the incidence and risk factors of significant bilirubin rebound in neonatal indirect hyperbilirubinemia developed after intensive phototherapy. Methods: A prospective study was done on 275 neonates in the neonatal care unit at Babylon Teaching Hospital for Maternity and Pediatrics for the period from April to December/2016. Patients who received intensive phototherapy are followed for checking of significant bilirubin rebound. Intensive phototherapy was administered according to standard guidelines. Patients were investigated for TSB and PCV every 12±6 hours, then re-checked after 18±6 hours after stopping phototherapy. Results: From the total jaundiced patients included in our study, 30/275(10.9%) developed significant bilirubin rebound. Of the latter, 17/30(56.66%) developed rebound before their discharge from hospital and 13/30(43.3%) developed rebound after discharge. Most common assigned etiologies of rebound were onset of jaundice before 60 hours of life (9.45%; P=0.010), Rh incompatibility (9.09%; P≤0.001), age on presentation less than 60 hours (8.36%; P≤0.001) and weight less than 2.5kg (7.27%; P= 0.003). Among neonates without these four risk factors, the rebound was not detected, while in neonates with one, two, three or four risk factors, rebound was detected in: 16.66%(5/30), 20%(6/30), 30%(9/30) and 33.33%(10/30), respectively. Conclusions: Significant bilirubin rebound occurred in 10.9% of patients and most significant risk factors were onset of jaundice <60hr of life, Rh incompatibility and birth weight <2.5kg.

Keywords: Rebound bilirubin, risk factors, intensive phototherapy, low birth weight, Rh incompatibility.

INTRODUCTION

Jaundice was early mentioned in a Chinese textbook 1000 years ago. Medical theses, essays and text books from the 18th and 19th centuries contained discussions about the causes and therapy of neonatal jaundice. In addition, a lot of these texts described a fatal course in neonates who might have Rh isoimmunization [1]. In 1875, Orth firstly noticed a yellowish stain of the brain that had been named later on as kernicterus [2]. Jaundice affects nearly 60% of all normal neonates through the 1st week of their lives [3]. Jaundice may result from an underlying pathological disorder such as autoimmune hemolysis or red blood cell (RBC) enzyme deficiency. Jaundice commonly develop because of the normal physiological incapability of the neonate to metabolize bilirubin adequately as a result of the combined effects of increased RBC turnover and a temporary deficiency in bilirubin conjugation inside the liver [3]. This type is called physiologic jaundice [4]. The risk of occurrence of severe jaundice is very low, but when more risk factors exist, the risk of occurrence of severe jaundice is greater [5]. Neonates without any risk factor rarely have total serum bilirubin (TSB) concentrations above 12mg/dl. As risk factors increase, the possibility to develop markedly high bilirubin concentrations increases [2]. Significant bilirubin rebound (SBR) is the post-phototherapy increment of TSB level requiring reinstitution of
phototherapy according to guidelines [6]. With intensive phototherapy, the TSB concentration should decline by 1-2mg/dl within 4-6 hours [7,8]. Intensive phototherapy can be stopped when the TSB concentration is below 14mg/dl for full term babies [7]. The average rebound bilirubin concentration after phototherapy in majority of cases is below 1mg/dl, which is not significant [9]. Therefore, the objectives of current study were to detect the incidence of SBR after the intensive phototherapy in neonatal indirect hyperbilirubinemia and to identify the risk factors contributed for SBR after intensive phototherapy.

**METHODOLOGY**

A cross-sectional study conducted in the neonatal care unit of Babylon Teaching Hospital for Maternity and Pediatrics which is the referral hospital for Babylon province. Applicable information was collected for about 275 neonates needing intensive phototherapy for hyperbilirubinemia during birth hospitalization or after re-admission for intensive or conventional phototherapy from April 2016 to December 2016. The neonates enrolled in current study were term and preterm neonates having indirect hyperbilirubinemia and treated with intensive phototherapy, and those patients who were re-admitted again and received phototherapy. Any neonate admitted to the intensive care unit and managed with blood exchange transfusion, with direct hyperbilirubinemia, extreme prematurity, and signs of sepsis at time of admission, or those who were treated just with conventional phototherapy according to the standard guidelines were excluded from the study. A full history was taken from their close family members (mostly their mothers) including age in hours at admission, gender, birth weight, mode and place of delivery, perinatal history, maturity, age in hours at onset of yellowish discoloration of skin, early follow up, previous hospital admission, signs and symptoms of sepsis, family history of siblings with neonatal jaundice, phototherapy, blood exchange transfusion and kernicterus, feeding pattern, mother’s age, mother’s health status, and if there was multiple pregnancy. Full clinical examination for all included patients was done. reticulocytes count, coomb’s test, blood film, assay of G6PD level , and random blood sugar. Blood cultures and C-reactive protein were done (for suspected cases of sepsis), as well. For patients born at ≥35 completed weeks of gestation with birth weight ≥2.500kg, phototherapy was started according to age in hours and total serum bilirubin levels as per American Academy of Pediatrics guidelines. For patients born at <35 completed weeks of gestation and their birth weight <2.500kg, the decision to start phototherapy was made on the basis of their weight and total serum bilirubin levels. Phototherapy was stopped when TSB had fallen 2mg/dl below the level at which phototherapy was started according to the standard guidelines. In hyperbilirubinemia due to hemolysis, phototherapy was stopped when two consecutive TSB levels had fallen 2 mg/dl below the level at which phototherapy was started according to the standard guidelines. Phototherapy was provided with patients lying supine in open bassinet, using overhead blue 4 lamp fluorescent units, with a distance of 20cm from patient’s body. The equipment used in our neonatal care unit is (Mediprema tunnel 360 infantile phototherapy apparatus; Figure 4), the manufacture company (CENTRE D’AFFAIRES MEDICAL -FRANCE). During phototherapy, TSB levels were determined at 12±6h and more frequently if needed by clinical assessment. Some patients have been changed to conventional phototherapy after falling of their TSB due to intensive phototherapy according to clinical judgment. Total serum bilirubin was measured 12±6hr after stopping intensive phototherapy so as to check for rebound hyperbilirubinemia. If TSB level increased to a level that required re-institution of phototherapy, it was considered a significant bilirubin rebound. Patients who developed rebound hyperbilirubinemia were submitted to re-institution of phototherapy while those patients whom did not developed SBR were discharged and dated for re-checking of TSB in 12-24hr. Some of them were returned and did the TSB level, in some cases, SBR was noticed, so they were admitted and received phototherapy again.

**Statistical analysis:** The data were analyzed statistically using computerized SPSS system (version 21). Also, using chi-squared test to measure the relative importance of various variables and using Binary logistic regression analysis test to detect the variables which increase the odds of (SBR).

**RESULTS**

Two hundred and seventy five neonates were included in this study. There were 145/275 (52.7%) males and 130/275 (47.27%) females with the M : F ratio was 1.16 : 1. In addition, 57/275 (20.7%) were ≤60 hr of age and 218/275 (79.3%) were >60 hr of age.
Also, 178/275 (64.8%) were term and 97/275 (35.2%) were preterm. There were 166/275 (60.4%) weighing more than 2.500kg, 109/275 (39.6%) weighing ≤2.500 kg. Moreover, 190/275 (69.1%) were exclusively breast fed, 56/275 (20.4%) were exclusively bottle fed and 29/275 (10.5%) were on mixed breast and bottle feeding. Furthermore, 226/275 (82.2%) were delivered by normal vaginal delivery (NVD) and 49/275 (17.8%) were delivered by Caesarian section C/S.

Table (1) showed the variables included in the questionnaire; sex, age, weight, delivery mode, maturity, type of feeding, onset of jaundice, history of previous admission, history of any affected siblings, ABO and Rh blood groups, reticulocytes count, coomb’s test, and G6PD level. Each variable regarded as count, total number, and percentage SBR related to each variable.

Thirty patients out of 275 developed SBR that means that (10.9 %) who required the re-institution of phototherapy (Figure 1). Of this group, 17/30 (56.66%) developed SBR while they were still in their same admission while 13/30 (43.3%) developed SBR after discharge, so they were re-admitted and received phototherapy again (Figure 2). Statistical analysis firstly done on the different variables encountered in the study by using chi-squared test and results were shwon in Table (1). The obtained values were considered significant when P≤0.05 .Those values are listed according to their significance in descending manner in Table 91). The latter showed that the age on presentation was less than 60 hours (P≤0.001) bearing the most significant risk factor for causing SBR jaundiced neonate. In addition, weight below 2.5kg (P≤0.001) had the same significant effect. Furthermore, Rh incompatibility (P≤0.001) between the neonates and their mothers considered a significant factor in rebound hyperbilirubinemia which reflected the tendency of continued hemolysis, especially if associated with positive coomb’s test (P= 0.001). Moreover, high reticulocytes count (P= 0.001) (normal values for 1 day, 7 days and 1-4 weeks are ≤6%, ≤1.3% and ≤1.2%, respectively) [8]. Other important factors were history of previous affected siblings (P= 0.002) and received phototherapy or treated by blood exchange transfusion. Also, ABO incompatibility (P= 0.024), between the baby and the mother, is statistically important in SBR occurrence. Binary logistic regression was done to analyze our collected data to determine the factors that increase the odds of the SBR. Table 3) showed the results of regression analysis. P value ≤0.05 was considered significant. Results of current study revealed that most common assigned etiologies of SBR were: onset of jaundice before 60 hours (9.45%), Rh positive (9.09%), age on presentation less than 60 hours (8.36%) and weight less than 2.5kg (7.27%) as showed by Figure (3). Among neonates with absence of all these four risk factors, incidence of SBR was not found. Among neonates with presence of one, two, three or four risk factors, incidence of SBR was 16.66% (5/30), 20% (6/30), 30% (9/30), and 33.33% (10/30), respectively, (Figure 4).

Table 1 Distribution of patients according to variables and risk factors

<table>
<thead>
<tr>
<th>Variables</th>
<th>Count</th>
<th>Patients with (SBR)</th>
<th>Total No. of variable</th>
<th>% within variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17</td>
<td>145</td>
<td></td>
<td>11.7</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>130</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 60hr</td>
<td>23</td>
<td>57</td>
<td></td>
<td>40.35</td>
</tr>
<tr>
<td>&gt; 60hr</td>
<td>7</td>
<td>218</td>
<td></td>
<td>3.2</td>
</tr>
<tr>
<td>Delivery mode</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NVD</td>
<td>27</td>
<td>226</td>
<td></td>
<td>11.9</td>
</tr>
<tr>
<td>C/S</td>
<td>3</td>
<td>49</td>
<td></td>
<td>6.1</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥2.5kg</td>
<td>10</td>
<td>166</td>
<td></td>
<td>6.02</td>
</tr>
<tr>
<td>≤2.5kg</td>
<td>20</td>
<td>109</td>
<td></td>
<td>18.3</td>
</tr>
</tbody>
</table>
### Table 1 Distribution of patients according to variables and risk factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeding</td>
<td>Breast</td>
<td>22</td>
<td>190</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>Mixed</td>
<td>4</td>
<td>29</td>
<td>13.8</td>
</tr>
<tr>
<td></td>
<td>Bottle</td>
<td>4</td>
<td>56</td>
<td>7.1</td>
</tr>
<tr>
<td>Maturity</td>
<td>Term</td>
<td>11</td>
<td>178</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>Preterm</td>
<td>19</td>
<td>97</td>
<td>19.6</td>
</tr>
<tr>
<td>Onset of Jaundice</td>
<td>&gt;60 hr</td>
<td>4</td>
<td>168</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>≤60 hr</td>
<td>26</td>
<td>107</td>
<td>24.3</td>
</tr>
<tr>
<td>Previous admission</td>
<td>Yes</td>
<td>13</td>
<td>23</td>
<td>56.5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>17</td>
<td>252</td>
<td>6.7</td>
</tr>
<tr>
<td>Rh incompatibility</td>
<td>Yes</td>
<td>25</td>
<td>73</td>
<td>34.2</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>5</td>
<td>202</td>
<td>2.5</td>
</tr>
<tr>
<td>ABO incompatibility</td>
<td>Yes</td>
<td>17</td>
<td>104</td>
<td>16.3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>13</td>
<td>171</td>
<td>7.6</td>
</tr>
<tr>
<td>Coomb’s test</td>
<td>Positive</td>
<td>24</td>
<td>41</td>
<td>58.5</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>6</td>
<td>234</td>
<td>2.6</td>
</tr>
<tr>
<td>Reticulocytosis</td>
<td>Yes</td>
<td>19</td>
<td>97</td>
<td>19.6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>11</td>
<td>178</td>
<td>6.2</td>
</tr>
<tr>
<td>G6PD</td>
<td>Positive</td>
<td>3</td>
<td>4</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>27</td>
<td>271</td>
<td>10</td>
</tr>
<tr>
<td>Affected sibling</td>
<td>Yes</td>
<td>14</td>
<td>66</td>
<td>21.2</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>16</td>
<td>209</td>
<td>7.7</td>
</tr>
<tr>
<td>TFT</td>
<td>Positive</td>
<td>1</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>29</td>
<td>273</td>
<td>10.6</td>
</tr>
</tbody>
</table>

![Figure 1 Percentages of SBR from the included groups.](image)
Figure 2 Percentage of in-patient and re-admitted patients who developed SBR.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Count</th>
<th>Total No. of variables</th>
<th>No. of patients with SBR</th>
<th>% within variable</th>
<th>% within SBR n=3</th>
<th>% within Total n=275</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>&lt;60hr</td>
<td>57</td>
<td>23</td>
<td>23</td>
<td>40.35</td>
<td>76.66</td>
<td>8.36</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>&gt;60hr</td>
<td>218</td>
<td>7</td>
<td>7</td>
<td>3.2</td>
<td>23.33</td>
<td>2.55</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;2.5kg</td>
<td>176</td>
<td>10</td>
<td>10</td>
<td>5.68</td>
<td>33.3</td>
<td>7.27%</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>&lt;2.5kg</td>
<td>99</td>
<td>20</td>
<td>20</td>
<td>20.2</td>
<td>66.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rh incompatibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>202</td>
<td>5</td>
<td>5</td>
<td>2.5</td>
<td>16.7</td>
<td>1.8</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Yes</td>
<td>73</td>
<td>25</td>
<td>25</td>
<td>34.2</td>
<td>83.3</td>
<td>9.09</td>
<td></td>
</tr>
<tr>
<td>Coombs test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>234</td>
<td>6</td>
<td>6</td>
<td>2.6</td>
<td>20.0</td>
<td>2.18</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Positive</td>
<td>41</td>
<td>24</td>
<td>24</td>
<td>58.5</td>
<td>80.0</td>
<td>8.72</td>
<td></td>
</tr>
<tr>
<td>G6PD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>271</td>
<td>27</td>
<td>27</td>
<td>10.0</td>
<td>90.0</td>
<td>9.81</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Positive</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>75.0</td>
<td>10.0</td>
<td>1.09</td>
<td></td>
</tr>
<tr>
<td>Maturity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.001</td>
</tr>
<tr>
<td>Mature</td>
<td>178</td>
<td>11</td>
<td>11</td>
<td>6.2</td>
<td>36.7</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Premature</td>
<td>97</td>
<td>19</td>
<td>19</td>
<td>19.6</td>
<td>63.3</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>Onset</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤60hr</td>
<td>107</td>
<td>26</td>
<td>26</td>
<td>24.3</td>
<td>86.7</td>
<td>9.45</td>
<td>0.001</td>
</tr>
<tr>
<td>&gt;60hr</td>
<td>168</td>
<td>4</td>
<td>4</td>
<td>2.4</td>
<td>13.3</td>
<td>1.45</td>
<td></td>
</tr>
</tbody>
</table>
Table 3 Independent variables associated with increased odds of SBR

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≤60hr</td>
<td>≤0.001</td>
</tr>
<tr>
<td>Rh incompatibility</td>
<td>≤0.001</td>
</tr>
<tr>
<td>G6PD positive</td>
<td>≤0.001</td>
</tr>
<tr>
<td>Prematurity</td>
<td>0.001</td>
</tr>
<tr>
<td>Previous sibling affected</td>
<td>0.002</td>
</tr>
<tr>
<td>Weight ≤2.5kg</td>
<td>0.003</td>
</tr>
<tr>
<td>Onset ≤60hr</td>
<td>0.010</td>
</tr>
<tr>
<td>Reticulocytosis</td>
<td>0.011</td>
</tr>
</tbody>
</table>

DISCUSSION

Among 275 (10.9%) patients treated by intensive phototherapy, there was 30 patient developed rebound hyperbilirubinemia. It was found that 5.1% of studied patients did have SBR and they did need re-institution of phototherapy [10], which didn’t agree with current study. This might be related to the low level of TSB considered to stop phototherapy and the relatively larger sample size of their study. On the other hand, [11] found that rebound increase in TSB occurred in (13.3%) of patients, this result was consistent with that of our study due to nearly similar circumstances to those of our study such as sample size and place of study (central hospital). However, [6] reported that (7.3%) of newborns developed significant bilirubin rebound. Although their work was nearly similar to ours, the reported low SBR percentage may be explained by the long time of hospitalization in intensive phototherapy (24±6hr) compared with that in our study (12±6 hr).

Regarding risk factors, this study found that the most common risk factors contributed to SBR were as follows: onset of jaundice before 60 hours (9.45%; P=0.010), Rh incompatibility (9.09%; P≤0.001), age less than 60 hours (8.36%; P≤0.001) and weight less than 2.500kg (7.27%) (P=0.003). In the study conducted by [12], the significant risk factors were positive direct Coomb’s test and preterm patients. Furthermore, SBR occurred among those in whom phototherapy was commenced <72hr, showing different results from most significant risk factors in our study.

Regarding the differences between the in-patient and re-admitted patients, we found that readmitted patients who received phototherapy were 4.7% while the in-patient neonates were 6.2%. Also, [13] found that repeated phototherapy for patients before discharge was (8.2%) and for readmitted patients was (0.7%). Current study found a statistically significant difference by logistic regression for some causes of hyperbilirubinemia.
that considered of a value in rebound hyperbilirubinemia. They were age <60 hours (P\leq 0.001), Rh incompatibility (P\leq 0.001), G6PD deficiency (P\leq 0.001), history of affected siblings (P= 0.002), weight <2.500kg (P= 0.003), onset before 60 hours (P= 0.010), and reticulocytosis (p=0.011). These data indicated that early discharge of patients with the previous risk factors is not recommended, especially for those who are premature or having risk of hemolysis. This conclusion agreed with the (2004) recommendation of AAP that made those reasons, prematurity and hemolysis, as an exception for early hospital discharge \[11, 14\]. Furthermore, \[12\] recommended the cautious discharge for neonates with positive Coomb’s, isoimmunization, borderline prematurity, onset of phototherapy <72 hours. In contrast, \[15\] suggested that measurement of TSB is not recommended after termination of phototherapy as it adds unnecessary costs and prolongs hospitalization; whereas \[6\] recommended that a bilirubin level should be obtained in high-risk neonates 18-24hr after stopping phototherapy. Discharge may be postponed for this purpose if follow-up is not ensured.

**Ethical Clearance:** It was obtained from the Scientific Research Committee at Babylon Health Directorate, Babylon City, Iraq.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**REFERENCES**


Association between Lipoprotein Lipase Polymorphism and the Myocardial Infarction in Patients with Diabetes Mellitus Type 2

Farah A. Ashour¹, Moaed E. Al-Gazally², Monem M.Alshok³

¹M. Sc. Student in Clinical Biochemistry Dept., College of Medicine, University of Babylon, Iraq. ²Clinical Biochemistry Dept., College of Medicine, University of Babylon, P.O. Box 473, Hilla, Iraq, ³College of medicine, University of Babylon, Iraq.

ABSTRACT

Background: Lipoprotein lipase plays an important role in lipid metabolism. The aim of this study was to explore the possible associations of gene polymorphisms LPL-HindIII and diabetes mellitus with myocardial infarction. Method: The polymorphisms were assessed by restriction assay in 60 Iraqi MI patients, 60 patients with diabetes mellitus and 60 healthy controls. Results: This study demonstrated that individuals with the H2H2 genotype higher relative risk of suffering from MI than those carrying the H1H1. Type 2 diabetes mellitus had mainly lower HDL-C levels in MI patients who carry H2H2 genotype and higher TC, TG, and LDL levels in MI patients carrying H2H2 genotype. Conclusion: These findings suggested that H2H2 genotype is associated with dyslipidemia and increased risk of myocardial infarction. The association of diabetes mellitus with this polymorphism leads to unfavorable lipid profile.

Keywords: Lipoprotein lipase, genetic polymorphism, type 2DM. lipids profile, myocardial infarction.

INTRODUCTION

Lipoprotein disorders partly account for the increased risk of atherosclerosis and coronary artery disease (CAD) in patients with type 2 diabetes [5]. Plasma lipids are major risk factors for CAD. Also, genes involved in lipoprotein synthesis and metabolism are considered excellent candidate gene for susceptibility to coronary artery disease [2,3]. Lipoprotein lipase (LPL) is a multifunctional protein that hydrolyzes core triglycerides (TG) from circulating chylomicron and very low-density lipoproteins (VLDL). During this process, surface-free cholesterol and phospholipids are transferred to high-density lipoproteins (HDL) particles, thereby increasing the concentration of HDL-C [4]. The gene coding for LPL is located on chromosome 8p22 [5] and is composed of 10 exons with a number of gene variants [6]. Most of the identified single nucleotide polymorphisms (SNPs) with functional effects cause loss of enzymatic function and predispose to elevated TG and reduced HDLC [7]. Of the several variants within this gene, the presence of a HindIII restriction site (H2 allele) in intron 8 has been associated with unfavorable lipid levels and coronary artery disease [8]. In type 2 diabetes, plasma LPL activity is decreased due to insulin resistance. This contributes to hypertriglyceridemia in diabetic patients [9]. The aim of our study was to explore the possible associations between the mentioned gene polymorphisms (LPL HindIII) and myocardial infarction (MI) in patients with type 2 diabetes mellitus.

METHOD

One hundred and eighty Iraqi subjects were included in this study; 60 patients presented with acute MI for first time and having diabetes mellitus, 60 patients with diabetes mellitus only, and 60 healthy subjects were included as a control group. The latter were age and sex matched to the patients and had same smoking status. They didn’t complain of any symptoms related to the cardiovascular system with normal clinical examination. They didn’t give a history of any disease associated with increased risk of myocardial infarction. The diagnosis of acute MI was made according to the World Health Organization criteria for MI, which required typical symptoms plus either elevations in cardiac enzyme levels or diagnostic changes in ECG [10]. Height and
weight were measured for all subjects to calculate body mass index (BMI).

**Ethical Clearance** was obtained from the Scientific Research Committee in the department of Biochemistry, College of Medicine Babylon University, Iraq.

**Blood collection and storage**

Blood was drawn in the morning after 12h of overnight fasting. Serum was prepared by clotting whole blood in a glass tube at room temperature for 1h and then centrifuged at 2,000g for 15min. Later, it was transferred into sterile vials in aliquots of 2ml, and stored at -70°C until further analysis.

**Determination the Biochemical Parameters**

FBS, HbA1C, LPL concentration were measured by ELISA-kit (Cloud clone corp.). TG, TC, HDL-c concentration were determined by an enzymatic colorimetric method. LDL-c concentration was calculated by utilizing Friedewald method. VLDL-c was calculated by the equation:

\[
\text{VLDL-cholesterol (mmol/L)} = \frac{\text{TG}}{2.22}.
\]

**Genotyping Analysis**

The DNA extraction kit (Favogene, Korea) used in purification of the DNA from whole blood \(^{[11]}\). Purity of extracted DNA was calculated by using namedrop apparatus and electrophoresis on the agarose gel (1%) \(^{[12,13]}\). By the UV trans-illuminator the agarose gel was visualized as presented in Figure (1).

![Figure 1 DNA extraction from blood; lanes 1-7 (patients) and lanes 8-10 (controls).](image)

<table>
<thead>
<tr>
<th>Primer F+R (5'-3')</th>
<th>Gene</th>
<th>Annealing temperature</th>
<th>Amplicon length</th>
</tr>
</thead>
<tbody>
<tr>
<td>F: 5_ AGT GAT TCA TAC TTT AGC TG 3_</td>
<td>lpl</td>
<td>58 Co</td>
<td>1200</td>
</tr>
<tr>
<td>R:5_ TGA GACACT TTC TCC CTA GA 3_</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 1 Amplification of LPL gene by using primers** \(^{[14]}\)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Temperature (°C)</th>
<th>Time (min)</th>
<th>Function</th>
<th>Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>95</td>
<td>4</td>
<td>Initial denaturation</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>95</td>
<td>1</td>
<td>DNA denaturation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>1</td>
<td>Primer annealing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>72</td>
<td>1</td>
<td>Template elongation</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>72</td>
<td>5</td>
<td>Final elongation</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
<td>Incubation</td>
<td>Hold</td>
</tr>
</tbody>
</table>

**Table 2 Primer amplification of LPL gene**
The amplification products were visualized by electrophoresis of PCR products for LPL gene on 1% agarose gel and used the Red Safe staining for photo documentation as shown in Figure (2).

Fig. 2 Electrophoretic pattern of the LPL genotyping; Lane M: DNA ladder 100 bp, Lanes (1-10) are about 600,1200 bp.

**DATA ANALYSIS**

Data entry and analysis were done using computer-based software (statistical package for social sciences; SPSS version 18). Continuous variables were presented as mean and standard deviation. Student $t$-test was used to determine the mean differences between groups. $P$ value of $\leq0.05$ was considered statistically significant.

**RESULTS**

A summary of baseline characteristics of the study population was presented in Table (2). MI patients presented higher BMI, total cholesterol, triglycerides, LDL-C, TC/HDL-C ratio, and lower HDL-C when compared to control group. Meanwhile, MI diabetic patients had higher BMI, TC/HDL-C, and low HDL-C level when compared with non-diabetic ones.

**Table 2 Baseline characteristics of study participants**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Control (n = 60)</th>
<th>Patients with DM (n = 60)</th>
<th>MI patients with DM (n = 60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/ years (Mean±SD*)</td>
<td>57.3±8.2</td>
<td>56.7±9.3</td>
<td>58.8±8.5</td>
</tr>
<tr>
<td>Gender (m/f)</td>
<td>(42/18)</td>
<td>(38/22)</td>
<td>(36/24)</td>
</tr>
<tr>
<td>BMI (kg/m2) (Mean±SD*)</td>
<td>17.7±2.52</td>
<td>18.84±2.16</td>
<td>20.46±1.68</td>
</tr>
<tr>
<td>Total cholesterol (mg/dl)</td>
<td>110.64±6.78</td>
<td>141.24±43.74</td>
<td>149.22±39.42</td>
</tr>
<tr>
<td>Triglycerides (mg/dl)</td>
<td>81.06±8.76</td>
<td>125.1±41.52</td>
<td>135.36±38.04</td>
</tr>
<tr>
<td>LDL-C (mg/dl) (Mean±SD*)</td>
<td>61.32±6.48</td>
<td>91.56±39.12</td>
<td>99.3±36.3</td>
</tr>
<tr>
<td>HDL-C (mg/dl) (Mean±SD*)</td>
<td>32.82±1.92</td>
<td>24.36±2.94</td>
<td>22.92±1.56</td>
</tr>
<tr>
<td>TC/HDL-C (Mean±SD*)</td>
<td>1.98±0.16</td>
<td>3.48±1.02</td>
<td>3.9±0.96</td>
</tr>
<tr>
<td>FBS (Mean±SD*)</td>
<td>5.09±0.61</td>
<td>7.67±1.66</td>
<td>7.74±2.34</td>
</tr>
<tr>
<td>HbA1c (Mean±SD*)</td>
<td>5.09±0.61</td>
<td>7.67±1.6</td>
<td>7.74±2.3</td>
</tr>
<tr>
<td>LPL (Mean±SD*)</td>
<td>31.54±3.1</td>
<td>17.32±2.7</td>
<td>14.6±3.1</td>
</tr>
</tbody>
</table>

Table 3 LPL gene \((\text{HindIII})\) polymorphism genotype and allele frequencies in the study groups

<table>
<thead>
<tr>
<th>Study Group</th>
<th>n</th>
<th>Genotype</th>
<th>Allele Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>H-H-(%)</td>
<td>H-H+(%)</td>
</tr>
<tr>
<td>Healthy Controls</td>
<td>60</td>
<td>7(11.6)</td>
<td>23(38.3)</td>
</tr>
<tr>
<td>Diabetes patients</td>
<td>60</td>
<td>5(25)</td>
<td>20(33.3)</td>
</tr>
<tr>
<td>MI patients with diabetes</td>
<td>60</td>
<td>5(25)</td>
<td>22(36.6)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The genes investigated in our study encode proteins with a role in assembly and secretion, or remodeling catabolism of plasma lipoproteins. Triglyceride-rich lipoprotein metabolism is impaired in type 2 diabetes [15] and LPL is responsible for a great deal of the lipid alterations found in these patients. Moreover, LPL is a strong candidate gene for atherogenic lipid profiles and coronary heart disease (CHD). So that, we studied the association of LPL genes with the risk of MI in Iraqi patients type 2 diabetes. We found that MI patients have higher cholesterol, higher triglyceride, higher LDL-C levels, and lower levels of HDL-C when compared with controls. In addition, diabetes, BMI, and HDL-C were independently associated with MI.

The LPL-HindIII polymorphism is located in intron 8 of the LPL gene. Therefore, it is unlikely to be associated with changes in LPL protein activity or conformation. Recent evidence suggested that the LPL-HindIII polymorphism may be in linkage disequilibrium with functional LPL variants such as the Ser447-stop polymorphism that seems to be associated with a beneficial lipoprotein phenotype [16]. However, it also seemed possible that the HindIII polymorphism may itself be functionally important, since it has been reported that some regions of intron 8 may be nuclease sensitive [17]. In the present study, the frequency of the LPL H2H2 allele pair was found to be approximately 50–60%. This figure was agreement with Mediterranean population in the northeast of Spain study [18]. Our data demonstrated that individuals with the H2H2 genotype have more than three times higher relative risk of suffering from MI than those carrying the H1H1 genotype.

Some previous studies reported an association between H2 allele and myocardial infarction [19], and positive family history of myocardial infarction [20]. However, [8] did not find such risk increment in German population although they reported an association of the LPL-Hind III polymorphism and lipid levels in the form of lower HDL by 6% and higher LDL by 6% [8]. This discrepancy in results may be due to ethnic differences of the studied populations. The genetic study added that LPL-Hind III polymorphism; H2H2 gene; was associated with an increase in total cholesterol, triglycerides, low density lipoprotein, TC/HDL-C ratio, and BMI level \((P<0.05)\) compared with H1H1 carriers. However, our study showed that Hind III polymorphism is not an independent risk factor for MI and is not an independent predictor of lipid levels.

Current study found no association between the studied polymorphism and diabetes. Our results showed that subjects carrying H1 allele were protected from increased serum total cholesterol, LDL-C and triglycerides, and from lower HDL-C. This association persisted even after adjusting for diabetes status. The gene polymorphism affected lipid profile regardless of the presence or absence of diabetes [21,22]. However, the presence of diabetes may lead to exaggeration of dyslipidemia produced by genes polymorphisms.

Our results showed that the H2H2 genotype of LPL gene HindIII polymorphism is associated with an increase in TC, LDL-C, and lower HDL-C levels in diabetic MI patients compared with non-diabetic ones who carry the same genotype. The effect of the LPL gene HindIII polymorphism in type 2 DM has only been investigated in a few studies [23,24]. Moreover, [14] speculated that type 2 DM provides a condition which
causes decreased sensitivity of the HindIII H2 allele to insulin regulation leading to reduced LPL activity.

**Ethical Clearance:** It was obtained from the Scientific Research Committee at Department of Biochemistry/ College of Medicine/ University of Babylon. Iraq.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**REFERENCES**

16. Groenemeijer BE, Hallman MD, Reymer PW, Gagne’ E, Kuivenhoven JA, Bruin T, Jansen H,


Clinical Evaluation of 0.2% Hyaluronic Acid and its Effect on the Level of Interleukine-1B in Gingival Crevicular Fluid Before and After Treatment of Plaque Induced Gingivitis

Ahmed K. Hussien Al-Shabeeb1 A.N., Mohammed B.D.S1
1Department of Periodontics/ University of Baghdad/ Collage of Dentistry, Baghdad, Iraq.

ABSTRACT

Background: One of the most prevalent periodontal diseases is plaque-induced gingivitis. Hyaluronic acid is linear polysaccharide found in the extracellular matrix of connective tissues, synovial fluid and other tissues. Hyaluronic acid was used as adjunct to the mechanical plaque control because of its anti-inflammatory and bacteriostatic properties. Gengigel (0.2% Ricerfarma-Italy) is a gel form of Hyaluronic acid used in dentistry for treatment of gingivitis and acceleration of wound healing as in treatment of mouth ulcers. Interleukin 1 beta is a pro-inflammatory cytokine which has an important function in immunity and inflammation. Current study was aimed to evaluate the clinical and biochemical outcome of 0.2% of Hyaluronic acid gel and its effects on IL-1β in gingival crevicular fluid (GCF) in patient with plaque-induced gingivitis and to compare, clinically, between the effects of scaling and the gel in treatment of gingivitis. Methods: Sample population consisted of (25) subjects; 11 females and 14 males who had plaque-induced gingivitis. A split-mouth procedure was used in this study so that the mouth was subdivided into two division, left and right sides of maxillary arch only. The right side received scaling and then collection of GCF to determine the concentration of IL-1β in the first visit. In the same manner, the scaling was done on the left side and GCF was picked and then the patient was informed to put a Gengigel on the upper right side only three times daily for 1 week. The second visit presented with only collection of GCF from both sides to provide the calculation of the volume of GCF and the concentration of IL-1β. Results: Intra-group comparison of IL-1β concentration showed non-significant difference in both sides but there was a decrease in the IL-1β concentration in the gel side other than the scaling side. Inter-group comparison at second visits of IL-1β concentration showed no significant difference between scaling and gel sides. Conclusion: The split-mouth procedure used in this research had the advantage of allowing paired comparisons to be made. There was a slight positive decrease in the interleukin 1β after topical application of HA after one week but the duration of application must be continued more than 1 week to reach a good decrease of IL-1β in GCF which is a sign of less periodontal destruction because HA inhibits the expression of mRNA for proinflammatory cytokines (IL-1β).

Key wards: hyaluronic acid, gingival crevicular fluid, gingivitis, interleukin 1β, split-mouth.

INTRODUCTION

The gingiva is the part of oral mucosa which surrounds the necks of the teeth and covers the alveolar ridge. It is part of the tooth-supporting structure of the periodontium, and by forming a connection with the tooth via the gingival sulcus, it protects the underlying tissues of the tooth attachment from the oral environment [1,2]. Gingival epithelium acts as a protector to the deep structure and allowing a selective exchange with oral environment [3].

Plaque-induced gingival disease is derived by an interaction between tissues and inflammatory cells of the host, on the one hand, and the microorganisms found in the dental plaque (biofilm), on the other hand. The host-plaque interaction can be changed by the effects of malnutrition, medications, local factors and/ or systemic factors can alter the duration and severity of the response. Local factors that may contribute to gingivitis, added to plaque-retentive calculus formation on root and crown surfaces, are acquired or developmental deformities.
and conditions of the teeth. These factors have a major responsibility due to their ability to collect plaque microorganisms and prevent their removal by patient-plaque control measures [4].

Hyaluronic acid (HA) is occurring in nature and it is a linear polysaccharide of the synovial fluid, extracellular matrix of connective tissue and other tissues. It’s used in inflammatory process treatment. In dentistry, HA is utilized in the treatment of periodontal diseases due to its anti-inflammatory and antibacterial effects. Also HA could be used as an adjunct to mechanical therapy in the treatment of periodontitis because of its tissue healing properties [5]. Gengigel is a commonly used topically on gingiva which has been established in gel form recently containing the active constituent, exogenous hyaluronic acid; mean m/w 1,500,000) that has high-molecular weight, which is nontoxic in the form of its pure sodium salt achieved by the method of biotechnology at the concentration of 0.2%. Gengigel has a high adherence property to remain in situ. The addition of 2, 4-dichlorobenzene methanol boosts antibacterial and antiseptic activities of Gengigel. In addition, the formulation contained a pleasant gel sweetened with the non-cariogenic sugar xylitol. Gengigel provides maximum adhesion and thus allows hyaluronic acid (which would otherwise be eliminated by constant salivary drainage) to remain in situ [6].

The highly vascular connective tissues of the periodontium simplify the exit of cellular and molecular constituents of blood into periodontal tissues; this will form a fluid called gingival crevicular fluid which bathes into the sulcus [7]. Gingival crevicular fluid is a serum exudate that carries all cellular (plasma cells and neutrophils) and key molecular (antibodies and complement components) constituents of the immune response which has important role in prevention of tissue invasion by sub-gingival plaque bacteria. Analysis and collection of gingival crevicular fluid has been a common way to study localized inflammatory processes in gingivitis and periodontitis [8].

Interlukine-1β is a fundamental inflammatory bio mediator and is employed in a series of cellular actions such as cellular proliferation, differentiation and apoptosis. IL-1β performs an important function in immunity and inflammation, it is closely related to the innate immunity reaction and it stimulates the manufacture and discharge of more mediators that lead to more inflammatory changes and tissue disintegration [9].

IL-1β is responsible for most of the systemic activities attributed to IL-1 including fever, production of acute phase proteins and activation of phagocytes. It is cleaved intracellularly to an active form that is then secreted by monocytes [10].

**Materials and method**

**Subjects**

The study was conducted at College of Dentistry/University of Babylon, Iraq. It involved 25 dental students (14 males and 11 females) at their 4th and 5th years of study who were 20-24 years old. Because the day time makes a difference on the effect of IL-1β, all samples were obtained at the same period from 10-12 A.M [11].

**Study design**

The study was experimental randomized with non-masked split mouth comparative clinical trial. The patients were told about the study purpose and they are free to agree or refuse to take part in the research and they must sign consent. They got a questionnaire including: name, age, full dental, medical and drug history and whether they smoked or not.

**Inclusion criteria**

- Subjects with good general and oral health.
- Subjects who had not received any periodontal therapy for the past 3 months.
- Subjects with moderate gingivitis (at least 25% of test sites showing bleeding on probing).
- Ability of the subjects to attend the hospital at regular intervals.

**Exclusion Criteria**

- Subjects received medications that could change the state of gingival tissues.
- Subjects got orthodontic intervention.
- Subjects had pockets, muco-gingival problems and periodontitis.
- Subjects had more than five carious teeth that need immediate treatment.
• Subjects use any other supplemental plaque control measures like mouthwashes or interdental cleansing aids.
• Subjects had a fixed attitude of taking alcohol, chewing tobacco or smoking.
• Subjects had a systemic disease (any type).
• Subjects had chronic desquamative gingivitis.

Gengigel Application

The Gengigel was applied topically onto the gingival surface by putting the gel on the finger and applied gently with pressure on it after taking clinical parameters from each patient. The patients were informed to apply the gel repeatedly three times daily in the same way for 7 days after regular oral hygiene regimen. Patients must not drink, eat or rinse for 1 hour after application.

Gingival crevicular fluid (GCF) collection

The maxillary teeth were chosen to get the test sites from them to prevent contamination with saliva. Isolation and accessibility can be provided by taking GCF samples from the buccal sites only. All individuals enrolled in this study were informed not to brush their teeth for ≥1 h before collection of GCF and not to eat anything to avoid the change of GCF volume. Before GCF samples collection, the tooth must be isolated with the cotton roll and then supragingival plaque was removed immediately by using curette without making injury or touching the gingival margin. Sites should be dried by using the air of triple syringe directly for 5 seconds and then the periostrips were inserted into gingival sulcus for each examined site until mild resistance was felt for 30 seconds. Periostrips must be discarded if they are contaminated with blood. Eppendorff’s tubes were used as containers of wetted strips containing (300µL) phosphate buffer saline. The amount of GCF collected was calculated by using the equation (density= weight/volume) assuming that the density of GCF is same as that of water (i.e. 1) \[12\]. The weight of periostrips can be obtained by using sensitive balance (four digits after the point) and strips were weighed before taking samples. Also, Eppendorff’s tubes were weighed when they contain BPS only then after putting sample strips into them, the tube balanced and subtract from the sum of the weight of dry strip and the weight of Eppendorff’s tubes \[12\]. The GCF can be removed from periostrips by centrifugation at 3000rpm by using cooler centrifuge (hettich-zentrifugen-germany) for 15 minutes. The GCF sample was kept at (-40°C) until analysis was done by Enzyme linked immunosorbent Assay (ELISA) \[13\].

Detection of the IL-1β

The concentration of IL-1β was determined by using ELIZA (microplate ELIZA reader device; Elabscience “CHINA”).

RESULTS

Table 1: relation between concentration and variable

<table>
<thead>
<tr>
<th>Variables</th>
<th>No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age range (20-24) years</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>44</td>
</tr>
<tr>
<td>Male</td>
<td>14</td>
<td>56</td>
</tr>
<tr>
<td>Brushing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>NO</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>SC</th>
<th>SC + TG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application day</td>
<td>No.</td>
<td>MEAN.</td>
</tr>
<tr>
<td>0</td>
<td>25</td>
<td>11.14</td>
</tr>
<tr>
<td>1week</td>
<td>25</td>
<td>12.18</td>
</tr>
<tr>
<td>t-test</td>
<td>-0.351</td>
<td>0.425</td>
</tr>
<tr>
<td>P value</td>
<td>0.728 NS</td>
<td>0.674 NS</td>
</tr>
</tbody>
</table>
The dataset distribution was determined by using the Shapiro-Wilk test. This method was used to find the suitable way to verify the differences of the IL-1β concentration and indices between 1st and 2nd visits in each side. Furthermore, a Shapiro-Wilk test examined the distribution of sample size with less than 50. The data set was approximately normally distributed; therefore, parametric paired $t$-test was used. Besides, the continuous variable values were presented as mean ± standard deviation (SD); the other variables were described by absolute numbers and percentages.

A sensitivity analysis was also performed on all the results to determine whether a small sample size and possibly skewed data affected the results. Therefore, a non-parametric test, the Wilcoxon signed rank test, was undertaken. The IL-1B concentration analysis revealed non-significant association between SC1-SC2 (0.861), SCTG1-SCTG2 (0.946), SC2-SCTG2 (0.618) and the $Z$ are (-0.174, -0.067, -0.497) respectively. The other indices also showed no change in the results.

**DISCUSSION**

There is an intimate relation between dental plaque and the initiation and progression of inflammatory periodontal and gingival diseases. Recently, pharmacological study has switched from an antimicrobial to an anti-inflammatory approach to therapy on periodontal disease intervention.

Hyaluronic acid has anti-inflammatory effect represented by its role in normalizing the macro-aggregation of connective tissue proteoglycans and de-
activating bacterial hyaluronidase [16].

In this study (Table 1, and figures 1, and 2), a trial had been made to check the performance of Gengigel (0.2% hyaluronic acid), in the treatment of gingival inflammation, applied topically and measured the level of IL-1B in GCF. The recall period of this study was 1 week [18]. The IL-1B concentration was recorded at ‘0’ day and 7th day. The level of IL-1B in the scaling side (left side) was increased from 11.15±10,12 to 12.19±13,89 where as in the gel side the concentration was none significantly decreased from 9.74±7,42 to 8.88±6.33 [19,20]. This study was the first study that deals with the effect of HA on IL-1B in human plaque induced gingivitis. The expectation was that the concentration will be more decreased when the period of usage of gel becomes longer, so further studies must be implicated in longer recall visits.

CONCLUSION

There was a slight positive decrease in the level of IL-1B after topical application of HA after one week, but the duration of application must be continued up to a month to reach a good decrease of IL-1B in GCF which is a sign of less periodontal destruction because HA inhibits the expression of mRNA for proinflammatory cytokines (IL-1b).

Ethical Clearance: It was obtained from the Scientific Research Committee at University of Baghdad/ Collage of Dentistry, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

REFERENCES

10. Stevens CD, Miller LE. Clinical Immunology and Serology: A Laboratory Perspetive: FA Davis; 2016.
13. Alwan AH. Determination of Interleukin-1β (IL-1β) and Interleukin-6 (IL6) in Gingival Crevicular Fluid in Patients with Chronic Periodontitis; 2015.
15. Alshabeeb RK. Assessing the Dietary Intake Changes in People with Type 2 Diabetes Following Carbohydrate Awareness Education Session: University of Sheffield, Faculty of Medicine, Department of Oncology and Metabolism; 2016.


A Statistical Study of the Recurrence Rates of Cancers in Different Groups

Sarah Salih Hasan¹, Wisam Jasim abed ali², Hasanain Ali Shubbar³

¹Albayan university College/Iraq, ²College of Science/Sumer university/Iraq, ³Alkafeel university College/Iraq

ABSTRACT

Background: Cancer is a group of diseases involving abnormal cell growth with potential to invade, or spread to, other parts in the body. Vaccination against certain infectious diseases, not eating too much processed and red meat and avoiding too much sunlight exposure can prevent some cancers. Also, early detection through screening is useful for cervical and colorectal cancers. The aim of this study was to shed light on the most widespread cancers in Iraq in the Middle Al-Forat region in Iraq. Also, it is hoped that researchers and state health institutions can take the necessary measures to reduce the disease and increase the numbers of survivors by raising awareness about benefits of early detection.

Method: Data were collected from Middle Al-Forat Centers of cancer in Iraq during the year 2017 about most common types of cancers. The results were analyzed by Statistical Analysis System program to study the effects of different parameters. Chi-squared test was used to compare between percentages.

Results: Data from current study revealed that the incidence of cancer was highest in the age group 61-70 year followed by the age groups 41-50 and 51-60 years. On the other hand, the rest of the groups were lower in the proportion of cancer incidence. In addition, the results showed that 10 types of cancers were selected as the most common ones and the most frequent cancer types were breast, lung, bladder and brain cancers, respectively. Conclusion: Many factors can contribute to pathogenesis of cancer in humans. However, some of these factors are preventable and controllable.

Keywords: Cancer, vaccination, cancer incidence, lifestyle measures, vaccination.

INTRODUCTION

Cancer is a group of diseases involving abnormal cell growth with potential to invade, or spread to, other parts in the body [⁴]. These contrast with benign tumors, which do not spread to other parts of the body [⁵]. Possible signs and symptoms of tumors include a lump, abnormal bleeding, prolonged cough, unexplained weight loss and a change in bowel movements [⁶]. While these symptoms might indicate cancer, they could have other causes [⁷]. Over 200 types of cancers affect humans [⁸]. Many cancers can be prevented by stopping smoking, maintaining healthy weight, avoiding drinking too much alcohol and eating plenty of vegetables, fruits as well as whole grains. In addition, by vaccination against certain infectious diseases, not eating too much processed and red meat and avoiding too much sunlight exposure [⁹]. Early detection through screening is useful for cervical and colorectal cancer [⁰]. The benefits of screening for breast cancer are controversial [¹].

The aim of this study was to shed light on the most widespread cancers in Iraq in the Middle Al-Forat region in Iraq. Also, it is hoped that researchers and state health institutions can take the necessary measures to reduce the disease and increase the numbers of survivors by raising awareness about benefits of early detection.

MATERIALS AND METHOD

Data were collected from Middle Al-Forat Centers of cancer in Iraq during the year 2017 about most common types of cancers. The results were analyzed by Statistical Analysis System program to study the effects of different parameters. Chi-squared test was used to compare between percentages.

RESULTS AND DISCUSSION

The results showed that the highest incidence of cancer was in the age group 61-70 years followed by age
groups 41-50 years and 51-60 years (Figure 1); whereas the rest of the groups had lower incidence of cancer (Table 1). By extrapolating the collected evidence from the Central Euphrates Center for Oncology, the results showed that cancers of breast, lung, bladder and brain, respectively, were among the 10 types of cancers which were selected as most common cancers (Table 2). All these indicators can be used to develop a national plan to combat cancer as much as possible and to develop a certain guidance to prevent this deadly disease.

Table 1 Distribution of cancer cases according to age groups

<table>
<thead>
<tr>
<th>Age group/year</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>69/2215</td>
<td>3.12</td>
</tr>
<tr>
<td>11-20</td>
<td>96/2215</td>
<td>4.33</td>
</tr>
<tr>
<td>21-30</td>
<td>151/2215</td>
<td>6.82</td>
</tr>
<tr>
<td>31-40</td>
<td>202/2215</td>
<td>9.12</td>
</tr>
<tr>
<td>41-50</td>
<td>455/2215</td>
<td>20.54</td>
</tr>
<tr>
<td>51-60</td>
<td>435/2215</td>
<td>19.64</td>
</tr>
<tr>
<td>61-70</td>
<td>531/2215</td>
<td>23.97</td>
</tr>
<tr>
<td>71-80</td>
<td>202/2215</td>
<td>9.12</td>
</tr>
<tr>
<td>81-90</td>
<td>65/2215</td>
<td>2.93</td>
</tr>
<tr>
<td>91-100</td>
<td>10/2215</td>
<td>0.45</td>
</tr>
<tr>
<td>Chi-Squared test</td>
<td>---</td>
<td>9.152 **</td>
</tr>
<tr>
<td>P</td>
<td>---</td>
<td>0.001</td>
</tr>
<tr>
<td>** (P&lt;0.01).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Frequencies of the different cancer types and their rates among age groups studied in current study

<table>
<thead>
<tr>
<th>Type of cancer</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ovary</td>
<td>49/2223</td>
<td>2.20</td>
</tr>
<tr>
<td>Breast</td>
<td>543/2223</td>
<td>24.42</td>
</tr>
<tr>
<td>Thyroid</td>
<td>33/2223</td>
<td>1.48</td>
</tr>
<tr>
<td>Lung</td>
<td>237/2223</td>
<td>10.66</td>
</tr>
<tr>
<td>Kidney</td>
<td>24/2223</td>
<td>1.08</td>
</tr>
<tr>
<td>Bladder</td>
<td>119/2223</td>
<td>5.35</td>
</tr>
<tr>
<td>Pancreas</td>
<td>50/2223</td>
<td>2.25</td>
</tr>
<tr>
<td>Bone</td>
<td>33/2223</td>
<td>1.48</td>
</tr>
<tr>
<td>Prostate</td>
<td>48/2223</td>
<td>2.16</td>
</tr>
<tr>
<td>Stomach</td>
<td>28/2223</td>
<td>1.26</td>
</tr>
<tr>
<td>Brain</td>
<td>115/2223</td>
<td>5.17</td>
</tr>
<tr>
<td>Testes</td>
<td>6/2223</td>
<td>0.27</td>
</tr>
<tr>
<td>Others</td>
<td>938/2223</td>
<td>42.19</td>
</tr>
<tr>
<td>Chi-Squared test</td>
<td>---</td>
<td>11.76 **</td>
</tr>
<tr>
<td>P</td>
<td>---</td>
<td>0.0001</td>
</tr>
<tr>
<td>** (P&lt;0.01).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are about 200 known types of cancers. In addition, as with most illnesses, cancer is a multifactorial condition which means that there is no single cause for any type of cancer [5]. One of the reasons are genes which are responsible for the coded messages inside the cell that tell it how to behave (which proteins to make) [9]. Mutations or changes to these genes, such as damage in code, can alter cell behavior [10]. Mutations may indicate that too many proteins are made or that proteins are not made at all [11]. Significantly, it needs a number of genetic mutations within the cell before it becomes cancerous [12].

The first reason is that something damages in the cell, changing its behavior and makes it more likely to be cancerous. It is called carcinogen [13]. The second reason is age. Many types of cancers become more prevalent with age [14]. The longer people live, the more exposure to carcinogens will be and more time there is for genetic changes or mutations to take palce in the cells [15]. The third reason is the genetics. Some people are unfortunately born with a genetically inherited high risk for specific cancers (genetic predisposition) [3]. This does
not mean developing cancer is guaranteed, but a genetic predisposition makes the disease more likely \cite{10}. For example, women who carry BRCA 1 and BRCA 2 breast cancer genes have higher predisposition to develop this form of cancer than women with a normal breast cancer risk \cite{17}. However, less than 5\% of all breast cancers are known to be due to genes. Therefore, although women carrying one of these genes are individually more likely to develop breast cancer, most cases are not caused by a high risk inherited gene fault. This is true for other common cancers, such as colon cancer, where some people have a genetic predisposition \cite{4}. Moreover, the immune system may play a role in cancer pathogenesis as some people who have weakened immune systems are at higher risk of developing some types of cancer \cite{18}. This includes people who have had organ transplants and take drugs to suppress their immune system to prevent organ rejection. In addition, some people have HIV infection or AIDS or other medical conditions that reduce their resistance to disease \cite{19}. Also, certain lifestyles and environmental factors are known to cause mutations that can cause cancer \cite{15}. Lifestyle and environmental causes are, to a large extent, controllable or avoidable \cite{9}. The latter include body weight, diet and physical activity. Cancer experts estimated that maintaining healthy body weight, making changes to our diet and taking regular physical activity could prevent about one in three deaths from cancer \cite{1}. Many people eat too much red and processed meat and not enough fresh fruit and vegetables \cite{17}. This type of diet is known to increase the risk of cancer \cite{10}.

Overweight or obesity (Obese means being more than about 25\% overweight) \cite{15}. Overweight or obese people have an increased risk of bowel and pancreatic cancers, probably due to a tendency towards higher insulin levels \cite{20}. Obesity can also increase the risk of oesophageal cancer, kidney and gallbladder cancers as well as breast and uterine cancers in women \cite{18}.

Regarding alcohol drinking, there is a growing evidence that all types of alcoholic drinks can cause of number of cancers \cite{19}. The latter include mouth, throat (includes pharyngeal cancer), laryngeal and oesophageal cancers as well as liver, breast and bowel cancers (in men). Even moderate alcohol intake increases the risk of cancer \cite{9}.

In terms of tobacco smoking, it is known to contain at least 80 different cancer-causing substances (carcinogenic agent) \cite{13}. When smoke is inhaled, the chemicals enter the lungs, pass into the blood stream and are transported throughout the body \cite{14}. This is why smoking or chewing tobacco not only causes lung and mouth cancers, but also it is related to many other cancers \cite{4}. The more and the younger a person smokes and the longer they keep smoking, the higher the risk of cancer is \cite{8}.

Moreover, ionizing radiation can play a role in cancer pathogenesis. Man-made sources of radiation can cause cancer and are a risk for workers \cite{9}. The main risk is, however, prolonged and unprotected exposure to ultraviolet radiations from the sun which can lead to melanoma and other skin malignancies \cite{7}. Fair-skinned people, those with lot of moles or who have a relative with melanoma or non-melanoma skin cancer are at highest risk \cite{6}.

Furthermore, work place hazards could contribute to the incidence of some cancer types. Some people are being exposed to a cancer-causing substance because of the work they do \cite{18}. For example, workers in the chemical dye industry have been found to have a higher incidence of bladder cancer \cite{13}. Asbestos is a well-known work place cause of cancer particularly a cancer called mesothelioma which most commonly affects the coverings of the lungs \cite{19}. Nonetheless, infection is another contributing risk factor. A proportion of cancers can be caused by infections with viruses. However this does not mean that these cancers can be caught like infections, rather, the virus can cause changes in cells that make them more likely to become cancerous \cite{9}. Examples on the latter include cervical cancer, linked to human papilloma virus, primary liver cancer which can be caused by the Hepatitis B and C viruses and lymphomas linked to Epstein-Barr virus \cite{10}. Bacterial infections have not been thought of as cancer-causing agents in the past \cite{11}. However, studies have shown that people who have helicobacter pylori infection of their stomach develop inflammation of the gastric epithelial lining which increases the risk of gastric cancer \cite{12}. Conclusion: Many factors can contribute to pathogenesis of cancer in humans. However, some of these factors are preventable and controllable.

**Ethical Clearance:** It was obtained from the Scientific Research Committee at Middle Al-Forat Centers of cancer in Iraq.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare

REFERENCES


Impact of Drinking Reverse Osmosis Water (RO Water) on Human bone Density in AL-Najaf City

Fulath Abdul-Redah Muhsin
MSc Community Health, The Head of Community Health Department / Al-Kufa Technical Institute / Iraq

ABSTRACT

Background: In the last period, the demand for bottled and filtered water has increased, especially water purified by reverse osmosis method (RO water). However, the latter is considered low-mineral water. This study was aimed to find if there is any effect of drinking RO water on bone density in humans in AL-Najaf Governorate, Iraq. Method: cross-sectional comparison research in which 126 people were included and divided into two groups; study group (drinking RO water) and comparison group (drinking tap water). Results: There were highly significant differences in water properties values between RO and tap water as the total dissolved solids of RO water was (16 mg/L), less than the standard that developed by WHO. The pH value of RO water was (6.60) tend to be acidic, while the pH of tap water was (7.52) tend to be neutral. There were highly statistically significant differences for all categories of DEXA diagnosis results (Normal, Osteopenia, and Osteoporosis; P≤0.001, 0.0001, and 0.0001, respectively) between study and comparison groups. Also, high statistically considerable difference of (P≤0.0001) presented between normal bone density of persons within the that of persons within the comparison group. Moreover, there was high statistically considerable difference of (P≤0.0001) existed between abnormal bone density of persons within the study group and abnormal density of persons within the comparison group. Furthermore, there was a strong direct positive correlation between drinking RO water and bone density categories (Osteopenia and osteoporosis) with (r = 0.87).

Keywords: Reverse osmosis water, bone density, osteopenia, osteoporosis, tap water, total dissolved solids, DEXA.

INTRODUCTION

There are many elements present in drinking water and the most important are the four main elements; calcium, magnesium, sodium and potassium. They exist in the form of salts such as sulfur, carbonate, chloride or others [1].

Bones are the main stores of minerals in the human's body; also they are of high importance in the process of minerals balance in the body. Any deficiency in magnesium or bicarbonate found in drinking water can affect bone health causing osteopenia or osteoporosis [2].

One of the most important technologies for purifying water is the reverse osmosis approach (RO). This method utilizes semipermeable membrane for the purpose of removing large particles, molecules and ions from drinking water. Concerning RO, applied pressure is utilized for overcoming osmatic pressure, a colligative property which depends on chemical possible difference with regard to the solvent and thermodynamic part meter. Various suspended and dissolved species could be removed from water via RO such as bacteria. Also, it could be utilized in producing potable water and for industrial processes. The outcome is that the solute will be kept on the pressurized side to the other side. Ions and large molecules must not get through the pores of the membrane to be considered “selective”, yet it must only permit small pieces of the solution (solute molecules) to get through in the normal osmosis procedure, then the solvent will move in a natural manner from the area of low-solute concentration (high water potential) via a membrane to the area of high-solute concentration (low water potential). The reason of this movement is the decrease in system’s free energy as the difference is reduced in the solvent concentration on either side of the membrane, which will generate osmotic pressure because of the movement of the solvent to the high
Due to the ease of drinking bottled water, the better taste of bottled water and the harms presented in tap water, recently, consuming bottled drinking water has been elevated quickly. In addition, RO water has become a major source for drinking water next to tap water.

The decrease or loss of calcium (Ca) in RO water results in lack of bone reservoirs causing bone brittleness and an elevated hazard of experiencing fractures (osteoporosis). Moreover, acid-base status in the body due to consumption of RO water can also influence mineral loss.

Therefore, the aim of current study was to find the effects of drinking RO water on bone density in humans.

**MATERIALS AND METHOD**

**Study design:** A cross-sectional comparative study conducted during the period from 1st, November 2017 to 1st, March 2018 in Al-Najaf city which is about 165 kilometers south of the capital Baghdad, and sixty kilometers south of Babylon.

**Methods:** Dual-energy x-ray absorptiometry scan (DEXA) has been utilized in the study. The examination results of adult persons depend on directing the x-ray to two regions in the body; lumber vertebra and thigh bone. Then the values were calculated and computerized as normal bones, osteopenia or osteoporosis on the screen of the device.

**(B)- Based on the publication of World Health Organization (WHO), results can be interpreted as follows:**

1. Normal: when BMD is not more than one Standard Deviation (SD) below young adult mean (T>-0.1).
2. Osteopenia: when BMD is 1.0-2.5 SD below young adult mean (-1.0>T>-2.5).
3. Osteoporosis: when BMD is more than 2.5 SD below young adult mean (T<-2.5).

**Sampling and data collection**

A- Samples were collected from the X-ray ward at Al-Sadder Teaching Hospital in Al-Najaf city, Iraq. Every person who referred to this ward and examined end by DEXA scan was included in the Presto study.

B- Questionnaire: A well designed questionnaire by specialized persons was used in this study, the data were collected directly from the persons by interview in the X-ray ward.

**Inclusion criteria:** all healthy adult males and females in Al-Najaf city were included in this study.

**Exclusion criteria:**

Persons who were excluded from the study were those with:

1. with some chronic diseases and women during menstrual period, 2- smokers, 3- havinh low body weight, 4- family history of osteoporosis, 5- endocrine disease, 6- hormone replacement therapy and 7- medication for hypertension.

**Statistical analysis:** Descriptive and analytical statistics were carried out by utilizing Statistical Package for Social Sciences (SPSS; version 20). t-test and Pearson correlation coefficient (r) were applied to obtain any significant statistical difference.

**Results**

The results of current study revealed that the study group (drinking RO water) and control group (drinking tap water) were age-matched and there was no statistically significant difference between them (P= 0.48; Table 1). On the other hand, there were high differences in water properties values between RO water and Tap water.

Moreover, data of current study showed that there were statistically highly significant differences for all categories of DEXA diagnosis results (0.001, 0.0001 and 0.0001, respectively) between study group who was drinking RO water (low mineral water) and comparison group who was drinking tap water in Al-Najaf city (Table 3, Figures 1&2).

Furthermore, results from current study showed that there was a strong direct positive correlation between drinking RO (low mineral) water and bone density category (Osteopenia and osteoporosis) with (r = 0.87).

This finding indicated that there was a relationship between drinking RO water and decrease in bone density (Figure 3).
Table 1 Comparison between study and control groups

<table>
<thead>
<tr>
<th></th>
<th>Drinking RO water</th>
<th>Drinking Tap water</th>
<th>P-value (t-test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study group</td>
<td>n = 126</td>
<td>Control group</td>
<td>n = 126</td>
</tr>
<tr>
<td>Age/years (Mean±SD*)</td>
<td>32.49±7.7</td>
<td>33.54 ± 8.2</td>
<td><strong>0.48</strong></td>
</tr>
</tbody>
</table>

Standard Deviation. **Non-Significant.

Table 2 Properties of Tap water and RO water of total dissolved solids (TDS) and pH value

<table>
<thead>
<tr>
<th>Properties</th>
<th>RO water</th>
<th>Tap Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDS (mg/L) (Mean)</td>
<td>16</td>
<td>459</td>
</tr>
<tr>
<td>pH value</td>
<td>6.60</td>
<td>7.52</td>
</tr>
</tbody>
</table>

TDS: Total dissolved solids.

Table 3 Diagnostic categories for bone density in DEXA X-ray device between study and control groups based on criteria of WHO

<table>
<thead>
<tr>
<th>Category (DEXA diagnosis)</th>
<th>Drinking RO water</th>
<th>Drinking Tap water</th>
<th>P-value (t-test)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 126</td>
<td>n = 126</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>15</td>
<td>120</td>
<td>*0.001</td>
</tr>
<tr>
<td>Osteopenia</td>
<td>90</td>
<td>5</td>
<td>*0.000</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>21</td>
<td>1</td>
<td>*0.000</td>
</tr>
</tbody>
</table>

*: Statistically highly significant.

*: Statistically highly significant.
DISCUSSION

Water is the important supply for minerals elements the body needs and these elements can affect bone metabolism \[^{13}\].

In the present study, the results showed that there was a high portion of mineral elements that are being removed from reverse osmosis drinking water (RO water). In addition, pH and total dissolved solids (TDS) of RO water were lower than those recommended for drinking water quality limits of Iraq according to WHO recommendations (Table 2). On the other hand, tap water was with the recommended quality limits \[^{14}\].

Moreover, current study showed that there were highly statistically significant differences for all category of (DEXA) device diagnosis results (Normal, Osteopenia, and Osteoporosis) between study group (drinking low mineral RO water) and the comparison group (drinking tap water) in Al-Najaf city. These findings clarified the impact of the type of drinking water on bone quality and density.

The study found that there has been a statistically considerable difference between normal bone density of persons within the study group and that of persons within comparison group (P≤0.0001; Table 3, Figure 1). that drinking Tap water of (15, 120 people) respectively.

Also, results of present study revealed that there was statistically highly considerable difference between abnormal bone density of persons within study group and that of persons within comparison group (P≤0.0001; Table 3, Figure 2). These findings might be due to the affected of bone formation process by acidity status of RO water which leads to excretion of calcium in the urine. Also, continuous drinking of low minerals water (RO water) leads to lack of most minerals that are important for bone formation.

Moreover, the study found that there was strongly positive direct correlation between drinking of low mineral (RO) water and bone density categories (osteopenia and osteoporosis) (r= 0.87; Figure 3). This finding indicated that there was a relationship between drinking of RO water and the decrease in bone density. These findings were in agreement with a study conducted in China \[^{15}\].
This correlation that was found in the present study is considered first result that was confirmed practically on humans by a researcher. Also, current study explained that tap water is good for healthy bone density and good quality, as it contains more adequate minerals than RO water.

**CONCLUSION**

Current study revealed that participants in the study and comparison groups were age-matched. In addition, the properties of RO and tap water were different with latter being of better quality. Also, current study reported statistically significant differences in all categories of DEXA diagnosis results (Normal, Osteopenia, and Osteoporosis) between the two groups under investigation. Therefore, a strong association exists between drinking the low mineral RO water and the decreased bone density reported in current study.

**Ethical Clearance:** It was obtained from the Scientific Research Committee at AL-Najaf Health Directorate and AL-Kufa Technical Institute, Iraq.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**REFERENCES**


Oral Health Care Utilization of Internally Displaced Migrants Residing in Al-Najaf City

Azal Hadi Al-Masoody¹, Monadle R. Hadi¹
¹Al-Kafeel University College/Iraq

ABSTRACT

Background: After the conquer of Mosul City in 2014, people were forced to leave their homes and flee to save their lives. Migration has been one of many challenges that faced Iraqi Government. Many health care initiatives were organized to help internal migrants, however, of those, oral health care had little share.

Objectives: The aim of this study was to investigate the oral health care utilization of the internally displaced migrants in Al-Najaf City and compare it to their status before displacement. This would demonstrate the success of the governmental and non-governmental programs to enhance oral health care of this group of people.

Method: Data were collected using a questionnaire that was basically derived from Anderson and Newman framework for health care utilization. Inclusion criteria were men and women above 18 years old who were displaced for more than two years and currently living in Al-Najaf City.

Results: Of the sample investigated, 34% reported that their income has reduced significantly and it is not enough to cover their living expenses. The number of those who used the dental care after displacement was significantly lower than when they were back home (49% compared to 72%, P< 0.05).

Conclusions: Decreased socio-economic status had dramatically affected access to dental care. That is where the government and large organizations should have interfered to offer the required care. However, the observed decreased utilization of oral health care clearly concludes the shortage in attempts to help internal migrants on oral health level.

Keywords: internal migration, oral health care utilization, Anderson and Newman framework, Iraq.

INTRODUCTION

The violence that was witnessed in Iraq after 2003 had forced many people to leave their homes to safer districts inside Iraq and abroad. According to the UN Migration Agency, there has been more than five million Iraqis who have been displaced over the years inside Iraqi national borders since January 2014 [1]. Most of the currently displaced persons reside in the northern and central governorates such Al-Najaf City which received 3% of them making it the most receiving of the southern governorates [2]. The great influx of migrants had added more load on the health care system of the receiving cities.

Immigrants and internally displaced persons (IDPs) were believed to be highly exposed to increased health risks and restricted health service benefits [3]. The differences can be mainly associated with the behavioral features of the migrants that were brought from their home towns, or the previous experiences such as death and war tragedies that had led to psychological trauma, which in return could intensely constrain them from seeking health care. In addition, alterations in settings and standards of living, cultural and language differences [4] might have also added to the problems of health issues and the unwillingness of migrants to seek health care.

Oral health is a critical element for general health; yet, oral health and oral health care are frequently neglected when dealing with health problems. Many have studied oral health of migrants all over the world and most of them concluded that migrants are more
likely to have dental problems though they search for care less than natives \cite{5,6}. Financial causes \cite{7} and lack of health system awareness \cite{8} have been stated as possible explanations of the decreased utilization of oral health care among immigrants.

Oral health utilization is an accepted predictor of the oral health care system capacity to provide adequate public health education and to deliver health care to the patients \cite{9}. Inspection of oral care utilization is widely utilized in modern public health studies \cite{10} to measure the change in public oral health perception and the success of governmental programs in promoting oral health \cite{11,12}. Accordingly, it has become essential to study the oral health and utilization of oral health care among Iraqi immigrants. However, until the conduction of this research, no such survey has been undertaken on the health care utilization of Iraqi people; migrants or non-migrants. On the other hand, similar studies can be found in Sweden \cite{8} and Finland \cite{3}, both investigated the struggles of using dental care among Iraqi migrants over those countries.

Thus, we considered exploration within these groups to provide an overall image of the oral health care utilization situation of the immigrant people in Al-Najaf City. Since there was no baseline for the current study to be compared with, the health care utilization status of the DPs before migration has been examined and compared to the current status.

The use of health care depends on several elements. These can be divided into personal factors, society health behaviors and health care system factors. All of these have been measured in different public health studying models \cite{13-15}, however, the model of Anderson and Newman \cite{16} is the most suitable among studies in this field \cite{17}. Therefore, it has been implemented in our research with few changes to accommodate to current study’s special needs. Anderson and Newman framework suggested the factors influencing the utilization of health care are as follows: predisposing factors e.g. demographic conditions, cultural and personal beliefs as well as enabling factors, such as financial status of the IDPs and ease of access to health care system. Moreover, the need factors, as argued by the authors, depend largely on individual’s perception of his/her own health status.

**METHOD**

Data were collected using a questionnaire that was basically derived from Anderson and Newman framework for health care utilization. Several changes were introduced to the original model to adapt to the circumstances of current study. Educational level, language barrier, financial status, oral hygiene behavior, and perception of oral health were selected as factors that affect the use of oral health care. The migrants’ evaluation of the received dental treatment was also examined. The questionnaires were filled in Arabic and then translated by the researchers when visiting the migrants in their homes in Al-Najaf City. A total number of 100 IDPs were interviewed. Arabic speaking family members were involved to translate the questionnaire and the answers from Kurdish and Turkish to Arabic. Inclusion criteria were men and women above 18 years old on arrival; they were displaced for more than two years and currently living in Al-Najaf City.

The change of oral health care utilization of IDPs was measured by questions about visiting the dentist in Al-Najaf City in the past two years and compare results to their dentist visits in the last two years in their home towns. Age, gender, work status, marital status, language barrier, educational level, oral hygiene behavior and financial conditions were all investigated as factors affecting the use of oral health care.

**STATISTICAL ANALYSIS**

The results of these factors were then compared between current status and before migration status. Results were analyzed using Pearson’s Chi-squared test to detect significance of the different findings of oral health care users in relation to migration status and other variants.

**RESULTS**

The study investigated 100 internally displaced persons; 62 men and 38 women. Only 10% do not speak Arabic (90% of them were females) and 19% were illiterate (17% females and 2% males), with almost half of the participants were with the age group of 30-49 years. Of the sample investigated, the most important finding was that the number of those who used dental care after the displacement had significantly dropped than when they were back home (49% compared to 72%; $P< 0.001$).

The access to health care services was reported to be much more easier back home; where, 83% reported easy
access to dental service in their towns compared to only 42% in the current setting (P< 0.001). No statistically significant difference was found concerning the reason for dental visit between now and then. For those visited the dentist, 16% went for regular checkup and the other 84% went to treat certain oral problems.

Most of the sample (76%) were essentially living in rural areas; whereas most of them (82%) had moved into Al-Najaf City areas. Similarly, most of them (80%) rated the received dental service as good to very good.

**Oral Health Behaviors**

Majority of the sample IDPs (82%) preferred visiting the dentist in private clinics instead of governmental clinics; this preference did not change vividly upon migration.

Examined IDPs showed unnoticed change in dental hygiene; 97% practiced oral hygiene before migration and 93% after. Currently, 85% of the IDPs use dental brush, 3% uses dental floss and 5% uses dental picks in cleaning their teeth.

**Financial Factors**

Of the interviewed sample, 34% reported that their income has reduced significantly and it is not enough to cover their living expenses (P< 0.001). More than one fifth of the male participants lost their jobs (P< 0.05), and about 40% moved from owning their private housing back home into rented houses or free shelters.

**DISCUSSION**

The research revealed that the majority of the IDPs had accessed dental care units significantly less than they did before displacement (49% compared to 72%, P< 0.001). This confirms the effect of migration and its consequences on oral health care use and consequently oral health status of the migrants. These findings were in correspondence with the results of a study conducted in Sweden where the Iraqi and Iranian migrants were less likely to use dental care [8]. However, this is not the case for migrants in Finland, as they reported same use of dental health care as the native Finnish people[3]. This might be due to the availability of dental clinics and the oral health education among migrants in Finland. Still, all of these studies had been conducted on people who had migrated to another country. As far as current study was the first to be done on internally displaced people’s oral health in Iraq, there was no other research to compare with. Nonetheless, current research can provide us with significant data on the decrease of oral health care use after displacement.

In the current study, 83% of the sample reported that they had easily reached dental clinic when they were back home, the percentage has plummeted to 42% after the displacement. This decline can be due to many factors like poor financial and living conditions. Among those who visited the dentist, there was no significant difference regarding the reason of the visit before and after displacement, where most had dental problem driving them to the dentist, which is a common universal trait [3,18,19]. Poor financial status and significant loss of jobs have been shown to be significantly affected by migration (P< 0.05). Many (40%) moved into rented houses and free shelters after possessing their own accommodation back home. These unfortunate economic conditions of the IDPs can be linked to the decrease in the use of dental care. Expenditure on dental care in addition to transportation fees overburdens the household budget of the migrants. This agreed with the outcomes of other studies [3,10].

There is no difference in dental visits between urban and rural areas. This might be due to the possibility that dental clinics are well distributed over urban and suburbs in Al-Najaf City. Most of the sample IDPs visited the dentist in private clinic and not governmental centers, which does not differ distinctly from previous habit before displacement. This is probably due to a cultural belief that private clinics are better at providing health care. The fact that the preference did not change supports the suggestion that migrants uphold their same oral health beliefs from home towns [3]. This is also confirmed by the result that there was unnoticed change in dental hygiene behaviors. Majority of them continued cleaning their teeth, however, many shifted their behavior from daily to interrupted (P< 0.05), which can be certainly caused by the unfortunate events that the migrants have passed through.

Most of studied group (80%) rated the dental service they received in Al-Najaf City as good to very well, which is not different from the rating of the dental service in their home towns.

Language barrier has been shown to have a negative effect on the use of dental care among migrants to other
However, in the current study, this was not the case, as the majority of the IDPs can communicate effectively with the dental practitioners. Only 23% of the females did not speak Arabic, yet this was compensated by the fact that other family members may act as translators.

CONCLUSION

Decreased socio-economic status and unnatural psychological conditions are two of many consequences of internal migration. These have dramatically affected the access to dental care and the oral health habits of the migrants. That is where the government and large organizations should have interfered to offer the required care. However, the observed decreased utilization of oral health care clearly concludes the shortage in attempts to help internal migrants with oral health level in Iraq.

Ethical Clearance: It was obtained from the Scientific Research Committee at AL-Najaf Health Directorate, AL-Najaf City, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

REFERENCES


Post-Traumatic Stress Disorder among Mosul and Nineveh Medical Group Colleges Students: A Survey Study

Omaima Abdul Razzaq Zubair¹, Mohammad Yousif Mohammad²

¹Family and Community Medicine Department, Mosul Medical College, University of Mosul, Iraq,
²Family Physician Specialist at Al-Quds Health Center for Family Medicine Training, Nineveh Health Directorate, Iraq

ABSTRACT

Post-traumatic stress disorder is a serious, potentially debilitating condition that can occur in people who have experienced or witnessed a life-threatening event, such as a natural disaster, serious sudden death of a loved one, accident, terrorist incident, war, or other violent personal assault. This study addresses the level of post-Traumatic Stress Disorder among sample of civilians in Mosul city (Medical groups Colleges Students) exposed to trauma aggravated by terrorism, war and displacement and to explore its relation with various socioeconomic variables. A cross-sectional study was conducted in Mosul City on Medical Colleges Students as early as the first year of study began after liberation operations ended and education have been resumed to identify as early as possible the remnants effect of such operation on students. Questionnaire forms were distributed on a representative sample using post-traumatic stress disorder check list for posttraumatic stress disorder. Score >33 regarded as cut off point for differentiation between presence and absence posttraumatic stress disorder. The results show that Out of 4122 students, a representative sample of 351 students was chosen. All of them (100%) were experienced violence as they witnessed the military operations by themselves. The frequency of posttraumatic stress disorder among the study group was 15.1 %. Logistic regression analysis revealed no significant effect regarding age, sex and residence on PTSD. Conclusions: Post traumatic stress disorder was prevalent among Mosul city medical students more than other areas that used the same instrument for assessment, further evaluation and interventions is needed to help those who have suggestive symptoms of posttraumatic stress disorder.

Key words: posttraumatic stress disorder, and mental disorders, Mosul, Iraq.

INTRODUCTION

Posttraumatic Stress Disorder (PTSD) has a major public health significance, it is an anxiety disorder that can occur following the experience or witnessing of a traumatic event (¹). Posttraumatic stress disorder symptoms usually appear within 3 months after a traumatic event but can emerge months or even years later. Evidence that it may be associated with premature senescence (early or accelerated aging) which will have major implications on the quality of life and healthcare policy. Therefore, there is a need to re-conceptualize PTSD beyond the boundaries of mental illness, and instead as a full systemic disorder (²). This syndrome develops after exposure to an extreme stressful events which provokes fear, horror or helplessness and it is characterized by re-experiencing the trauma, avoiding reminders of the trauma and increase physiological arousal (³). Iraq civilians in general, (⁴) and Mosul people in particular have been exposed to wars, catastrophic events and widespread violence and terrorism during the last four decades and especially for the last four year. There are few resources available to help victims dealing with the resulting physical, psychological, and financial aftermath of those traumatic events. (⁵)

No reports were examining the effect of exposure to military operation in Mosul (2016-2017) and its exacerbating conflicts on the mental health of Mosul population.

This study was carried out to examine the current prevalence of PTSD among a group of Iraqi population especially students who constitute a large sector from the community and they are considered the cornerstone
for building the future of Iraq.

**METHOD**

**Ethical agreement**

This study was approved by scientific committee of the Family and Community Medicine Department, Mosul Medical College, University of Mosul, Iraq. Prior data collection informed consent from all the participants orally obtained after an explanation of the aims and objectives of the work.

**Study setting**

The study was conducted in Mosul city (Mosul Medical Groups Colleges, Mosul College of Medicine Nineveh Medical College, College of Pharmacy, College of Dentistry), the center of the Nineveh governorate in the north of Iraq. It involved the university of Mosul and Nineveh University as a sit for data collection.

**Study participants**

Out of (4122), total number of students of four colleges at the time of data collection, the sample size has been determined according to equation of sample size calculation for cross sectional studies of qualitative variables with known population and with 95% confidence interval with 5% margin of error (6), which results in sample size \( n = 351 \), who included in the study by systematic sampling randomization (where every third student in the class was selected).

Student selection according to each college, Larger sample was from Mosul Medical College which already has the highest number of students.

All included students were from Mosul and Nineveh Universities and their residence in Mosul and they have been stayed in Mosul during the Isis aggression and liberation operation. No participants’ refusal was detected. All other students none eligible for study criteria were excluded.

**Data collection**

A questionnaire form was developed consisting of items related to demographic characteristics of respondents (age, sex and residence), and existing health measurement instrument to measure PTSD (the DMS 5 \(^7\) \(^8\)). This form was distributed through visiting each college separately, convenient sample were obtained from 2\(^{nd}\) grade till 6\(^{th}\) grade of Colleges. The age range between was between 18-24 years. Data collection took place during the period from 1\(^{st}\) November to 30\(^{th}\) December 2017; after military operation has been ended. The collected data was confidential and anonymous. The PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders (DSM–5) is a 20-item self-report measure that assesses the presence and severity of PTSD symptoms.\(^8\)\(^9\)\(^10\)\(^11\).

Summing all 20 items (range 0-80) and using cut-point score of 33 appears to be a reasonable based upon current psychometric work. Test-retest reliability and concurrent validity have been done on 50 participants which were randomly chosen from same colleges, so to increase validity of the result which was 95 % matched.

The association of PTSD (dependent variable) with demographic and trauma exposure variable (independent variables) were tested by chi-square and Binary logistic regression. P value less than 0.05 was considered as significant.

**RESULTS**

During the two-months period of data collection, 531 students were included in the study out of the total 4122 students of four colleges. Table 1 shows that a half (56.1%) of the students was 22-23 years old and male to female ratio was 1.18:1. Residence inside Mosul city formed 83.2% of the total sample. Urban residence of Mosul city (i.e. inside city center) was encountered among 292 of the participant where 16.8% were from outside Mosul city.

**Table 1 Socio-demographic characteristics of the study population**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-21</td>
<td>64</td>
<td>18.2</td>
</tr>
<tr>
<td>22-23</td>
<td>197</td>
<td>56.1</td>
</tr>
<tr>
<td>24 and &gt;</td>
<td>90</td>
<td>25.6</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>190</td>
<td>54.1</td>
</tr>
<tr>
<td>Female</td>
<td>161</td>
<td>45.9</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inside Mosul city(urban)</td>
<td>292</td>
<td>83.2</td>
</tr>
<tr>
<td>Outside Mosul city(rural)</td>
<td>59</td>
<td>16.8</td>
</tr>
<tr>
<td>Total</td>
<td>351</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 2 depicts that (15.1%) of students reported score of 33 and more which indicative of presence of PTSD. From those 6% their score was more than 45.

Mean age of the participants who had suggestive score of PTSD was 23± 1.66 years and who didn’t have suggestive score were 22.7±1.37 years.

**Table (2) Post traumatic stress disorders check list (PCL) score detailed**

<table>
<thead>
<tr>
<th>PCL score</th>
<th>No. of students</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25</td>
<td>268</td>
<td>76.4</td>
</tr>
<tr>
<td>25</td>
<td>30</td>
<td>8.5</td>
</tr>
<tr>
<td>33</td>
<td>32</td>
<td>9.1</td>
</tr>
<tr>
<td>45</td>
<td>15</td>
<td>4.3</td>
</tr>
<tr>
<td>50 and OVER</td>
<td>6</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

The overall percentage of PTSD according to PCL 5 score is 15.1 % at the cutoff point of 33 total score.

Table (3) illustrates that by specific age group analysis there is a mild increase risk among age group (22-23) as odds estimates equals (1.6) while a protective effect found among 24 years and more age group (odds = 0.65), however, none of these relations were significant as p value (0.058, 0.05, respectively).

Thirty male students and 23 female students had PTSD. There was no significant difference in PTSD between males and females.

Place of residence exerts no effect on PTSD development, as odds estimates =0.84 and p value was not significant (0.66).

**Table 3 Socio-demographic characteristics of the study population with its relation to post traumatic stress disorder**

<table>
<thead>
<tr>
<th></th>
<th>PTSD SCORE &gt;=33 No(%)</th>
<th>PTSD SCORE &lt;33 No(%)</th>
<th>Chi square value</th>
<th>Odds estimate</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-21</td>
<td>10 (18.9%)</td>
<td>54 (18.1)</td>
<td>0.017</td>
<td>1.05±1</td>
<td>0.51</td>
</tr>
<tr>
<td>22-23</td>
<td>24 (45.3%)</td>
<td>173 (58.1)</td>
<td>2.98</td>
<td>1.6±2</td>
<td>0.058</td>
</tr>
<tr>
<td>24 and &gt;</td>
<td>19 (35.8%)</td>
<td>71 (23.8%)</td>
<td>3.41</td>
<td>0.65±3</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>30 (56.6%)</td>
<td>160 (53.7%)</td>
<td>0.15</td>
<td>1.125</td>
<td>0.69</td>
</tr>
<tr>
<td>Female</td>
<td>23 (43.4%)</td>
<td>138 (46.3%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inside Mosul city(urban)</td>
<td>43 (81.1%)</td>
<td>249(83.6%)</td>
<td>0.18</td>
<td>0.84</td>
<td>0.66</td>
</tr>
<tr>
<td>Outside Mosul city (rural)</td>
<td>10 (18.9%)</td>
<td>49(16.4%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*risk estimated were calculated in compares of each age group to all other as age group 22-23 shows mild increase risk of development of PTSD and age 24 and more shows minimum protective effect while no risk was found among age 20-21; however, all these relations where non-significant using binary logistic regression.
DISCUSSION

Reported lifetime prevalence of exposure to potentially traumatic experiences (PTEs) varies considerably between countries and, within countries, between certain groups (12) (13) (14). Higher frequency of exposure has been reported in inner cities and where natural disasters have occurred (15).

All of participants suffer from violence and fear which is extremely high among them as they witnessed the terrorism, destruction, violence, military operations, loss of close relatives or friends, or destruction of their home.

For the purpose of data collection, the chosen colleges have the students with minimal differences in socioeconomic status with approximate location inside University of Mosul and Nineveh University.

Most survivors of trauma return to normal given a little time. However, some people will have stress reactions that do not go away on their own, these individuals may develop PTSD (1), (16).

Although the reported high rate of trauma among study sample, however the prevalence of PTSD among them was (15.1%).

Several studies have examined the prevalence of PTSD among population all over the world where ever there is degree of violence, however there are no valid and reliable cross-cultural instruments capable of measuring torture, trauma, and trauma-related symptoms associated with diagnosis of posttraumatic stress disorder (PTSD). In the Middle East, Lebanon, a study found a 3.4% lifetime prevalence rate of PTSD in a nationally representative sample (n = 2,857) of adult Lebanese civilians, while in the Gaza Strip, researchers reported that the lifetime prevalence of PTSD among adults was 17.8%, both were depending on WHO Composite International Diagnostic Interview (17)(18). In Israel, 9.4% of the adult sample (n= 512) were determined to have PTSD assessed by the Stanford Acute Stress Reaction Questionnaire (19). A Community surveys among children and adolescents aged 1 to 15 years old (n = 3,079) attending primary health care centers in Mosul, Iraq during 2007 depending on evaluating mental disorder reported 10.5% prevalence rate of PTSD (20). In other country region reports lower PTSD prevalence as in US 6.8% (21), 1.3% in Germany, (13) and 1.3% in Australia (22), as those where depending on DSM-IV disorders in the National Comorbidity Survey. This observed a wide range of PTSD rates may be correlated with the degree of violence each population subjected to it, and also the instrument used in collecting data.

The present study shows high figure of PTSD where it’s used the most recent method for assessing PTSD (The PTSD Checklist for DSM-5, 2013) (23).

Previously, researchers have documented the exposure of Iraqis to violence (24), (25) added to that witnessing military operations and loss of close relatives and their friends exert more stress. It is well established that exposure to violence is a risk factor for PTSD (26), (27).

Moreover, other studies who depend on Harvard trauma questionnaire reflect much higher figure of PTSD as in southern Sudan (36.23%) (28), Sir Lanka (30.4%) (29), Afghanistan (39.87) (30) and Uganda (55.9%) (31).

Recently, if a patient meets a provisional diagnosis using above methods, he or she needs further assessment (e.g., Clinician-Administered PTSD Scale for DSM-5 CAPS-5) to confirm a diagnosis of PTSD, which was inapplicable in the present study which regarded as one limitation of the present study.

Current study displays some age related effect on PTSD either protective or increasing risk which is consistence with findings encountered by other studies (29-33). This effect might be due to difference in samples selection. No significant difference in the rate of PTSD between males and females is found in the present study, which is in similar to that in other literatures (34) (35), (33). The sex differences related to PTSD seems to be a cross-culturally consistent.

Further research may clarify the epidemiology of PTSD in Iraq in general which can specify future interventions needed.

CONCLUSIONS AND RECOMMENDATIONS

Evaluating the mental health will help professionals and sponsored for health to stand up on the future program that can be used to help people be better members of the society.

Conflict of Interest; None.

Financial Funding; Self-supported.
Ethical approval; present study performed according to ethical approval of ministry of higher education and scientific research

REFERENCES


5. National Center for PTSD. Trauma and PTSD among Civilians in Middle East. Advancing Sciences and Promoting Understanding of Traumatic Stress. Vermont, USA : s.n., 2010; Vols. 21,4, 1050-1835.


34. Rosner, R., Powell, S., Butolo, W. Butolo W. Post traumatic stress disorder three years after the siege of .

The Histopathological Effects of Silver Nanoparticles on the Liver During Gestational Stages

Najat F. Mohammed Salih¹, Gazwa D. Al-Nakeeb¹
¹Department of Biology, College of Science for Women, University of Baghdad, Baghdad, Iraq

ABSTRACT

This study aimed to investigate the histopathological effects of different doses (1, 5, and 10 ppm) of silver nanoparticles colloidal solution (AgNPs) on pregnant mice during the three stages of pregnancy. A pregnant Swiss albino mice (n=60) with age (45-60) days were randomly divided into three treated groups. They were injected intra-peritoneal with AgNPs for 5 days before mating, and then for 7 days during each stage of the gestational period. The mice were sacrificed immediately after the parturition, and the livers were being collected for histopathological examination. The results showed that the AgNPs effects on the pregnant liver caused histological changes; such as congestion, leukocytes infiltration and focal aggregation of lymphocytes in all treated groups. Hydropic degeneration, hepatocytes vacuolation and focal hyalinization were highly marked in the low dose-treated groups. Increase the number of macrophages in the hepatic parenchyma, necrotic hepatocytes including councilman bodies and pyknotic nuclei, and giant cells occurred in moderate and high dose-treated groups, these signs were more intensive in the second week of pregnancy. The results suggest that the AgNPs may cause hepatotoxicity during pregnancy, as indicated in a time-dependent manner and in a dose-dependent manner. More researches must conduct to best understanding for AgNPs toxicity on fetuses especially during the stage of organogenesis and stage of the fetal development with growth.

Key words: silver nanoparticles, gestation, liver, histopathology, maternal metabolism

INTRODUCTION

Recently, nanotechnology developed rapidly with the extensive using of silver in industry, medicine and other applications leads to release huge nanoparticles including AgNPs to the environment [1,2]. Nano-silver is an inorganic nanoparticles with a typical size less than 100 nm [3]. It has a high surface area to volume ratio that displays special physiochemical properties [4]. Due to its size-dependent optical, magnetic electrical properties and individual plasmon optical optical spectra properties is used in bio-sensing application, fluorescent labels, therapeutics, transfection vectors, the products of treating wound and burns, silver-coated catheters, and implantable medical devices. [5-7].

Ingestion, inhalation, and dermal exposure are routes to entrance AgNPs into the body of human and distributed throughout the body tissues after received to the bloodstream [8], the deposition and accumulation of the agglomerates of AgNPs in tissues depended on its size [9].

Recently, the chromosomal abnormality, hyperplasia and newly formation of bile ductules were marked signs in the female liver rats which injected intra-peritoneal with AgNPs (8.7 nm) [10] while [11] stated that pregnant mice (6GD-19 GD) managed orally with colloidal AgNPs (100 nm ≤), the black color larger size of AgNPs can be observe in maternal liver.

The toxicity effects of AgNPs (70 nm) on the rat liver tissue after oral administration showed several changes; such as inflammatory cells, sinusoidal dilation, and apoptosis around the central vein C.V. [12]. Also, the previous histological effects of AgNPs (40 nm) on male mice which subjected to skin injection documented by
as well as the female mice when exposed to AgNPs (≤30nm) through the wound, hepatic tissue showed nearly the same toxicity response [14]. Furthermore, the histological effects of AgNPs on maternal liver tissue including hemorrhagic patches, lymphocytes infiltration, vacuolated hepatocytes with few necrotic hepatocytes, and fibrosis regions have been stated by [4].

The present study aimed to investigate the histopathological effects of different doses of AgNPs on pregnant mice during the three stages of pregnancy; the stage of the implantation to layer derivation in the first week (1st week), organogenesis stage in the second week (2nd week), and fetal growth with development in the third week (3rd week).

MATERIALS AND METHOD

Silver preparation

Silver nanoparticles colloidal solution AgNPs was obtained from Nano Pars Panda Company (Iran) with a size (35-100) nanometer and its size was measured by using Scanning Electron Microscope SEM. The stock solution was sonicated by ultra-sonicator then the three doses (1, 5, and 10ppm) prepared after adding normal saline to stock solution [15,16]. The diluted solutions activated daily by magnetic hotplate stirrer before starting to inject animals [17,4].

Animals lab

Swiss albino mice female (n=60) and male (n=20) obtained from breeding colonies; Biotechnology Research Center/Al-Nahrain University and National Center for Drug Control and Research in Baghdad. The female mice with age (45-60) days and weight about (25-30) g. These animals were housed in plastic cages in a controlled room; temperature (20-23)°C, enough relative humidity, and artificial light-dark cycle (7 am to 7 pm) [16,18]. During the study period, mice had been fed on a specific diet with easy access to drinking water and left to acclimatize to these conditions for 7 days. The day 0 of gestation (GD 0) was determined at the morning when a vaginal plug was present after housed 1 female with 1 male overnight in a plastic cage [5,3,19].

Experimental design

Healthy pregnant mice were randomly divided into three treated groups according to gestational stages to study the effects of AgNPs injections for 5 days before the mating period and then for 7 days during each stage of the gestational period. The mice exposed to AgNPs intraperitoneally once a day, every morning in three doses (1,5 and 10ppm). Each stage of gestation including 20 mice which in turn subdivided to three treated groups according to the doses of the AgNPs plus control group intraperitoneally injected with normal saline.

Histopathological analysis

The liver was collected immediately after parturition, fixed in formalin(10%), embedded in paraffin wax after dehydrated with increasing concentrations of ethanol and cleared with xylene, the sections (5 µM thickness) were stained using H& E Stain [20]. The photos of the changes in the hepatic tissue were taken via Olympus Microscope/Germany with Digital Camera canon/Japan.

RESULTS

The histopathological alterations represented by hydropic degeneration and hepatocyte vacuolation which was highly marked sign in the low dose–treated group (fig. 2) in compare to control group (fig. 1) and other treated groups. On the other hand and in compare to low dose-treated group during 1st week of pregnancy, the liver showed focal hyalinization and fibrous necrosis during 2nd week of pregnancy (fig. 3); whereas the centrilobular hepatocellular hypertrophy and amyloid deposition in the vein wall appeared during 3rd week of pregnancy (fig. 4).

The liver sections of middle dose-treated groups showed increase number of macrophages in the hepatic parenchyma, necrotic hepatocytes including councilman bodies and pyknotic nuclei, and giant cells (fig. 5), these histological effects showed an increase of intensity especially in 2nd week of pregnancy in compare to the low dose-treated group. The leucocytes infiltration around the central vein C.V and in the portal area as well as the severe lymphocytes aggregation can be observed in middle doses-treated groups especially during 2nd week of pregnancy (fig. 6). But, the minimal degree of infiltrated leukocytes appeared in low dose- treated groups (fig. 4). Also, the centrilobular hepatocellular hypertrophy was seen in 3rd week-treated group (fig.7).

The severe focal aggregation of leucocytes with necrotic hepatocytes was seen in the high dose-treated group during 1st week of pregnancy (fig. 8). Also, the amyloid deposition in the wall of sinusoids was
observed throughout the hepatic parenchyma with slight focal hemorrhage, these signs were more intense in 2nd week of pregnancy (fig. 9) and moderate intense during 3rd week of pregnancy associated with vacuolation in the portal area (fig. 10).

Figure 1: liver section of mouse (control) shows hepatic cords HC, sinusoids S, and central vein C.V. H&E stain. 400x.

Figure 2: (1st week-low dose) shows: hydropic degeneration in hepatocytes (black arrow), congested sinusoid CON and focal hemorrhage (red arrow). H&E stain. 400x.

Figure 3: (2nd week-low dose) shows: hyalinization in the hepatocytes (arrow) and aggregation of leukocytes AG. H&E stain. 400x.

Figure 4: (3rd week-low dose) shows: leukocytes infiltration LI, congestion CON with amyloid deposition in the wall of vein (black arrow), hydropic hepatocytes (red arrow) and pyknotic nucleus (blue arrow). H&E stain. 400x.

Figure 5: (1st week- low dose) shows: giant cell (black arrow), councilman body (white arrow), pyknotic nuclei (red arrow), and leukocytes infiltration LI. H&E stain. 400x.

Figure 6: (2nd week-low dose) shows: severe leukocytes infiltration LI, congestion CON with partial hemolysis He in the dilated central vein, and aggregation of lymphocytes AG. H&E stain. 400x.
Figure 7: (3rd week-low dose) shows: congested central vein and centrilobular hepatocellular hypertrophy (arrow). H&E stain. 400x.

Figure 8: (1st week- low dose) shows: severe focal aggregation of leukocytes AG with necrotic hepatocytes N H&E stain. 400x.

Figure 9: (2nd week-low dose) shows: Hyalinization H in the hepatocytes, and hydropic hepatocytes (arrow). H&E stain. 400x.

Figure 10: (3rd week-low dose) shows: vacuolation V in the vessel wall, leukocytes infiltration LI in the portal area with congestion CON, and sinusoidal dilation SD. H&E stain. 400x

DISCUSSION

The extensive using of AgNPs in many applications, therapeutic, diagnostic, antibacterial sprays, detergents, cosmetics, cooking utensils, etc. result in release huge of AgNPs to our environments [10]. Accordingly, it is important to understand their toxicity on female especially during the pregnancy in addition to the metabolic role of the liver during pregnancy to support fetal development and growth.

In the present study, Histopathological alterations in the liver revealed that AgNPs accumulated in the hepatic tissue and its maximum effects were more remarkable during 2nd and 3rd week of gestation in a time-dependent manner compared to control and low dose-treated groups. This is may be associated with the maternal metabolism that is increased during 2nd week and 3rd week of gestation when the organogenesis and fetal growth with development take place. Furthermore, the liver is a major organ to clear the blood from drugs (detoxification) [21], in addition to its essential role in supporting the fetal growth when increasing the demands of oxygen in second half of pregnancy and maternal metabolism enhances catabolic mechanism [22]. The oxidative stress might be elevated as result of mitochondrial ROS production and reactive radical from cleavage $\text{H}_2\text{O}_2$ by the metals [23]. This is supported by [24] which stated that the liver is a target organ for AgNPs through its ability to induce mitochondrial changes in the hepatocytes and increase the level of ROS, this in
turn may effect on the ATP production which leads to damage hepatocytes. Another study carried out by [25] reveals that the antioxidants defence depression related with increase the oxidative stress which caused lipid peroxidation, it accompanies with histopathological observation (hepatocytes vacuolation) in liver tissues after subjected to AgNPs.

In the present study, Histopathological alterations in the liver also showed maximum effects of AgNPs with moderate and high doses (5ppm,10ppm) in a dose-dependent manner compare to control and low dose-treated groups. This result is supported by [10] which stated that the various liver lesions including degeneration, necrosis, and apoptosis in female rats expose to AgNPs were in a dose-dependent manner as well as the tissue residues of this nanoparticle related to treated dose. Another study by [26] showed that the depression of mitochondrial activity correlated with AgPNs concentration and the liver histopathological lesions (necrosis and apoptosis) increased following high dose treatment. Also, the histopathological changes in liver tissue of different doses of AgNPs (40 nm) following mice skin treatment for 7 days in a dose-dependent manner showed the high dose of AgNPs can cause the vacuolar degeneration of hepatocytes [13].

Finally, the severe effect of AgNPs in the present study took place during 2nd week of gestation in coupled with moderate and high doses compare to treatment during 3rd week of gestation. This may be related to the interval time between the first IP administration before mating and the second IP treatment during gestational days which allow to liver tissue to decrease the silver cytotoxicity through the elevation of the antioxidant defense and AgNPs removed from liver by macrophages, this supported presumably by increase the number of macrophages in the liver sections. This results in consistency with studies done by [27,12] which showed the role of macrophages to sequester AgNPs from the liver due to phagocytosis process, thus the nanosilver accumulation in this organ may be decreased. Also, the mice when orally treatment with AgNPs during pregnancy (6-19 day) caused oxidative stress in hepatic tissues at different doses and at different sizes (20nm and 1300nm) [4]. On the other hand, the accumulation of AgNPs (50nm) was higher in the mice liver during pregnancy in the 7-9 GD (early stage of organogenesis) and in dose-depended manner compatible with the capacity of this organ to identify and filter the foreign materials as part of the phagocytic system (macrophages) [28].

CONCLUSIONS

The results suggested that the extensive using of AgNPs in many applications may cause hepatotoxicity during pregnancy, as indicated in a time-depended manner and in a dose-depended manner. The histopathological alterations in pregnant’s liver which influenced by nanosilver and may be associated with the maternal metabolism that is increased during the second and third weeks of gestation when the organogenesis and fetal development with growth take place. More researches must conduce to best understanding for AgNPs toxicity on fetuses especially during the stage of organogenesis and stage of the fetal growth with development in addition to its abnormality effects on fetuses.

Ethical Clearance; the present study performed according to ethical approval of misitry of higher education and scientific research Of Iraq.

Source of Funding; Self -funding.

Conflict of Interest; there was no conflict of interest.

REFERENCES

4. Prakash, P. J. Royana, S., Pratap M. S., More, R.S. and Preeti, K. Particle size dependent
teratogenicity of silver nanoparticles in mice. MOJ Anatomy & Physiology. 2016;2(7):00074-00083


Comparative Effect of Topical Tacrolimus and Topical Isotretinoin in Patients with Oral Lichen Planus

Karar Abdulzahra Mahdi
Master in Oral Medicine, Department of Oral Pathology, College of Dentistry, University of Kufa, Najaf, Iraq

ABSTRACT

Oral lichen planus (OLP) is a chronic autoimmune, mucocutaneous disease that has been treated for decades with different topical and systemic medicament that have been reported to be effective and includes topical and systemic corticosteroids, retinoid, ultraviolet phototherapy (PUVA), immunosuppressant and immune. But a resistant to treatment and a high risk of toxicities limit their use. This work was aimed to compare the effect of topical tacrolimus 0.1% gel and topical Isotretinoin 0.1% gel in patients with oral lichen planus. The samples groups are Twenty-eight Patients (16 females and 12 male, mean age 33.6 ±11.3 years ; 14 patients per treatment group ) with symptomatic erosive and atrophic OLP randomized in double-blind study to be treated with tacrolimus gel 0.1% (group A) or isotretinoin 0.1% gel (group b). The Results show high significant effectiveness of tacrolimus compared to isotretinoin in reducing oral pain and significant difference in reducing the signs of OLP . It can be concluded that the use of topical tacrolimus 0.1% gel is more effective than Isotretinoin 0.1% gel in the reducing of the pain and sings of oral lichen planus.

Keywords: oral lichen planus, tacrolimus, isotretinoin

INTRODUCTION

Lichen planus is a chronic autoimmune, mucocutaneous disease. It may affect the oral mucosa, skin, genitals. In the majority of patients with oral lichen planus (OLP) there is no associated cutaneous lichen planus or lichen planus at other mucosal sites [1]. The middle-aged female patients are mostly affected [2]. OLP is also seen in children, but it is rare [3].

OLP appears clinically in at least six forms: reticular, popular, plaque like, atrophic, erosive and bullous lesions [4]. The oral lesions are often asymptomatic but symptoms ranging from soreness to severe pain interfering with eating, speech and swallowing can occur in atrophic and erosive form of OLP. The cause of OLP is still unknown, but it is approved that OLP represents a cell-mediated immune response with the infiltrating cell population composed of both T4 and T8 lymphocytes [5].

The management of OPL is aimed to eliminate mucosal erythema, ulcerations and decrease symptoms disease during periods of exacerbation and, if possible, increase the periods of disease remission. Reticular type is mostly asymptomatic and usually requires no treatment.

Many topical and systemic medicament for the oral lichen planus have been reported to be effective and includes topical and systemic corticosteroids, retinoid, ultraviolet phototherapy (PUVA), immunosuppressant drugs (hydroxychlorquione, azathioprine, mycophenolate mofetil and pimecrolimus). But a resistant to treatment and their adverse effect limit their use [6].

Tacrolimus is a macrolide immunosuppressant which is 10 to 100 times more potent than cyclosporine and is more able to penetrate the mucosal surface which has recently been shown to be effective and safe in the treatment of symptomatic oral lichen planus [7]. The side effect of topical tacrolimus was recorded as transient irritation including burning or stinging at the site of application [8].

Retinoids are a group of polyisoprenoid lipids derived from vitamin A (retinol) and its natural and synthetic analogs. retinoids can be classified into four different generations: the first generation includes retinol, tretinoin, isotretinoin, retinal, and alitretinoin [9]. Isotretinoin 0.1% gel was more effective than placepo in the treatment of erosive lichen planus but with side effect of transient burning, superficial desquamation and
The aim of this study was to compare between the efficacy of tacrolimus 1% gel and isotretinoin 0.1% gel in the treatment of symptomatic oral lichen planus.

Score | Characteristics
--- | ---
5 | White striae with erosive area $\geq 2m^2$
4 | White striae with erosive area $< 2m^2$
3 | White striae with atrophic area $\geq 2m^2$
2 | White striae with erosive area $< 2m^2$
1 | Mild white striae only

**MATERIALS AND METHOD**

Twenty-eight Patients (16 females and 12 male, mean age 33.6 ±11.3 years; 14 patients per treatment group) with symptomatic erosive and atrophic OLP attending to the Oral Medicine private Clinic were asked to participate in the study.

**Table 1 Thongprasom sign scoring for OLP**

In this double-blind study, patients were randomized to be treated with tacrolimus gel 0.1% (group A) or isotretinoin 0.1% gel (group b) the patients were instructed to apply the preparation four times daily for 6 weeks or until asymptomatic condition achieved. The application was instructed to be after meals without eating or washing the mouth for 30 minute after the application. The assessment of the lesion was recorded at the beginning and after 2, 4, 6 weeks of the beginning of the study.

The intensity of pain was scored the patients according to a numerical scale at the beginning and following each visit. Pain scores ranged from 0 (no pain) to 10 (extreme pain).

The sign of the lesion was scored by the examiner according to criteria set by Thongprasom et al. [11] (table 1). The size of the lesion was measured by a caliper between two opposite outer edges of the borders. Two different measurements were obtained and the largest diameter was chosen.

A thorough medical history was assessed before the study. Any topical or systemic medication previously prescribed for treatment of OLP was stopped 2 month prior to the study. The inclosing criteria of OLP was according to the presence of typical bilateral white striae and with exclusion of any lesions in contact with dental amalgam, and the use of any medication that could possibly cause lichenoid reaction.

Other exclusion criteria was diabetic and hypertensive patient and pregnant and lactating women. All participant was aged between 22 and 45 years old. The statistical analysis was done by Wilcoxon Signed Rank Test.

**RESULTS**

The pain scores for both groups are shown in (table 2). Before the starting of the study the mean (±SD) of the pain scores for group A was 7.21 (± 1.42) while for group B it was 7.93 (± 1.27) with insignificant difference between the two groups.

After 2 weeks of the treatment the pain decreased in both groups but was statistically more decreased in group A (P < 0.05). At week 4, 6 and 8 the pain scores decreased for both groups and the improvement in pain was highly significantly more in group A than group B (p < 0.01). At the end of the study 9 patients (64.3%) in group A had complete remission from pain while in group B the number was 4 patients (28.5%) only.

The sign scores for both groups are shown in (table 3). For the sign scores, the mean (±SD) for both groups (A and B) before the treatment was 3 (± 0.75) and 3.14 (± 0.74) respectively with significant difference. After 2 and 4 weeks of treatment there was a decrease in the diameter of the lesion in both groups but the difference was still not significant at this level of the study.
TABLE 2: Mean score of pain before and during 8 weeks of treatment. Group A treated with tacrolimus 0.1% and group B treated with isotretinoin 0.1%.

<table>
<thead>
<tr>
<th>Time</th>
<th>Group 1 Mean±SD</th>
<th>Group 2 Mean±SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 0</td>
<td>3 ± 0.75</td>
<td>3.14 ± 0.74</td>
<td>0.22</td>
</tr>
<tr>
<td>Week 2</td>
<td>2.71 ± 0.69</td>
<td>2.92 ± 0.7</td>
<td>0.35</td>
</tr>
<tr>
<td>Week 4</td>
<td>2.21 ± 0.55</td>
<td>2.85 ± 0.74</td>
<td>0.15</td>
</tr>
<tr>
<td>Week 6</td>
<td>2.14 ± 0.51</td>
<td>2.64 ± 0.81</td>
<td>0.02*</td>
</tr>
<tr>
<td>Week 8</td>
<td>1.64 ± 0.81</td>
<td>2.42 ± 0.62</td>
<td>0.01**</td>
</tr>
</tbody>
</table>

* P < 0.05: Significant difference by Wilcoxon Signed Rank Test.

** P < 0.01: High significant difference by Wilcoxon Signed Rank Test.

TABLE 3: Mean score of signs before and during 8 weeks of treatment. Group A treated with tacrolimus 0.1% and group B treated with isotretinoin 0.1%.

<table>
<thead>
<tr>
<th>Time</th>
<th>Group 1 Mean±SD</th>
<th>Group 2 Mean±SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 0</td>
<td>7.21 ± 1.42</td>
<td>7.93 ± 1.27</td>
<td>0.173</td>
</tr>
<tr>
<td>Week 2</td>
<td>5.92 ± 1.07</td>
<td>6.78 ± 1.56</td>
<td>0.03*</td>
</tr>
<tr>
<td>Week 4</td>
<td>4.5 ± 1.09</td>
<td>6.07 ± 1.53</td>
<td>0.000 **</td>
</tr>
<tr>
<td>Week 6</td>
<td>2.35 ± 1.27</td>
<td>4.07 ± 0.88</td>
<td>0.000 **</td>
</tr>
<tr>
<td>Week 8</td>
<td>0.92 ± 1.07</td>
<td>2.07 ± 0.96</td>
<td>0.000 **</td>
</tr>
</tbody>
</table>

* P < 0.05: Significant difference by Wilcoxon Signed Rank Test.

** P < 0.01: High significant difference by Wilcoxon Signed Rank Test.

After the 6 and 8 weeks of treatment the patients in group A had more improvement in the signs of the lesion than the patients in group B with significant difference.

After the end of the treatment (week 8) the number of patients who was completely free from ulcerative and atrophic lesion was 10 patients (71.4%) in group A and only 5 patients (35.7%) in group B, while the number of refractory cases was 3 patients (21.4%) in group A and 7 patients (50%) in group B. The buccal mucosa was mostly affected in most of patients in both groups followed by the gingiva, the tongue and the lip.

DISCUSSION

In this study tacrolimus 1% gel was compared to isotretinoin 0.1% gel in oral base in the treatment of erosive and atrophic oral lichen planus and tacrolimus was found to be more effective than isotretinoin in reducing pain and sign of OLP and this effectiveness may be due to due to different immunomodulating mechanisms in the two drugs.

In addition to oral lichen planus, topical tacrolimus has been used for the treatment of many oral white and ulcerative lesion. Connolly et al reported that tacrolimus is effective to reduce the severity of Exfoliative Cheilitis [12]. While Eckardt et al and Sanchez AR studied the effectiveness of tacrolimus in the treatment of oral chronic graft versus-host disease [13, 14].

About the intraoral site of OLP, the tongue, was less frequently involved than the gingiva, whereas in other
studies, the gingiva was reported to be less prevalent than the tongue\textsuperscript{[15, 16].}

About 64.3\% of the patients who were treated with tacrolimus achieved complete remission from pain while Corrocher et al reported pain remission in 56.3\% of patients\textsuperscript{[17].}

Giustina et al\textsuperscript{[18]} reported that twice daily application of isotretinoin gel 0.1\% for 8 weeks was effective in the improvement of 90\% of patients with OLP while in this study the pain remission in the group of patients treated with isotretinoin was reported in 28.5\% of patients and the proportion of patients with complete remission from atrophic and ulcerative lesion was 21.4\% and the reason for the difference in these results may be due to the effectiveness of isotretinoin in reducing the reticular and plaque-like lesion more than atrophic and erosive OLP.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ministry of higher education and scientific research

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**REFERENCES**


Association between Vitamin D Level and Polycystic Ovarian Syndrome in Premenopausal Iraqi Women

Rafal Mustafa Murshid¹, Alaa Abdulqader Abdulrazaq², Eaman Marouf Muhammed³

¹Department of Obstetrics and Gynecology, College of Medicine, University of Anbar/Iraq, ²Pathology department, College of Medicine, Ibn Sina University of Medical and Pharmaceutical Sciences, Baghdad, Iraq, ³Department, Al-Yarmouk Teaching Hospital, Baghdad, Iraq

ABSTRACT

Poly cystic ovarian syndrome (PCOS) is one of the commonest endocrine disorders in young age group female (with a prevalence of 6–10% in the general population). “PCOS is characterized by the following: ovulatory dysfunction resulting in oligo-amennorhea and/or anovulation, hyperandrogenism and/or hirsutism and the presence of polycystic ovarian morphology by ultrasound”. “Vitamin D also plays a physiologic role in reproduction including” ovarian follicular development and luteinization via altering anti Müllerian hormone (AMH)”, signaling, “follicle-stimulating hormone sensitivity and progesterone production in human granulosa cells.” the aim of this study was to determine whether “serum levels of vitamin D” were different between diseased (PCOS) and non-diseased women and; to determine whether its deficiency is associated with metabolic and endocrine dysregulations “in PCOS affected females”. a case-control prospective descriptive clinical study. Study setting: Obstetric and Pediatric Teaching Hospital in Al-Ramadi / Iraq. Patient and Methods: during the period from JAN 2018 to SEP 2018. It was included 80 women diagnosed with PCOS based on Rotterdam criteria and 20 fertile women without PCOS. The patient’s age were 18-45 years excluding the patients who were on hormonal replacement therapy for last 3 months, had endocrine or chronic hepatic or renal disorders, and women that take vitamin D for last six months. Other parameters were recorded; the weight and height of all patients and control group (calculating the BMI) and investigated for serum random blood sugar and vitamin D level using ELISA technique.

Results: the PCOS group had higher “body mass index (BMI)” and “random blood sugar(RBS)” value and the differences are both significant where the p values are 0.024 and 0.045 respectively. While the two groups were comparable in their ages and the difference where non-significant, p value is 0.10 (p value>0.05). large percentage of women were had low level of Vitamin D (91.25% ) and ( 94.9%) of the control group. The differences between all level of vit D of both group are not significant (the P value is 0.63 calculated using chi-sequare test). There is no, significant differences ) in the Vitamin D, levels “between obese and non–obese PCOS patients as the P value is 0.4552 and” the distribution of patients according to their Vitamin D levels graded as deficient, insufficient and normal values.

Conclusion: our result demonstrated (no difference) in serum vitamin D between (women with PCOS and control group) which suggesting that no clear correlations between “the role of vitamin D and the pathogenesis of PCOS”.

Keywords: vitamin D, PCOS, blood sugar and BMI.

INTRODUCTION

“Polycystic ovarian syndrome (PCOS) is a hormonal disorder affecting women in reproductive age, the prevalence of PCOS” is about 6–10% in the general population. The characteristics criteria of PCOS are: “ovulatory dysfunction resulting in oligoamenorrhea and/or anovulation, hirsutism and/or hyperandrogenism, and the presence of polycystic ovarian appearance by ultrasound” (¹). “PCOS is associated with an increased
incidence of cardiovascular disease (CVD) risk factors, like increased prevalence of subclinical atherosclerosis, type 2 diabetes, dyslipidemia, insulin resistance and impaired glucose tolerance", endometrial cancer and central obesity. (2,3,4) Serum 25-hydroxyvitamin D (25(OH) D) plays an important role in human general health, surveillance and reproduction (5). Vitamin D level is well “accepted as the functional” reflection for vitamin D “status in the body” (6). Until now days, “there is no general consensus on the adequate serum level of vitamin D that is best for health”. The concentrations of “25(OH) D” are classified as follows: levels “less than 50 nmol/L (20 ng/mL) are categorized as vitamin D deficiency, 50 to 74 nmol/L (20-30 ng/mL) as insufficiency” and the “serum” levels more than 74 nmol/L (30 ng/mL) as adequate (7). Vitamin D decreases insulin resistances by enhancing insulin synthesis, increasing insulin receptor expression and suppressing pro inflammatory cytokines (8). “Metabolic and endocrine abnormalities in women may be” mediated by insulin resistance “shown that the insulin resistance has a central role in the pathogenesis of PCOS and 50-80% of PCOS patients suffer from insulin resistance syndrome” (9). Vitamin D supplementation may reduce insulin resistance, blood glucose and level of triglycerides in PCOS. (10,11)

**MATERIAL AND METHOD**

A case-control study was carried out at obstetric and pediatric hospital in Al-Ramadi at outpatient infertility and family planning clinic from January 2018 to September 2018, including 80 women diagnosed previously as polycystic ovarian syndrome (PCOS) based on Rotterdam criteria (clinical or laboratory with radiological findings) and 60 female as control group. The patient’s age were 18-45 years excluding the patients who were on hormonal replacement therapy for last 3 months, had endocrine or chronic hepatic or renal disorders, and women that take vitamin D for last six months. During the study period, we recorded the weight and height of all patients and control group (calculating the BMI) and investigated for serum random blood sugar and vitamin D level using ELISA technique. The heamolized samples were discarded.

**RESULTS**

As shown in table 1, the PCOS group had higher “body mass index (BMI)” “and random blood sugar (RBS) “value and the differences are both significant where the p values are 0.024 and 0.045 respectively (p value < 0.05).While the two groups were comparable in their ages and the difference where non-significant ,p value is 0.10 (p value >0.05).

<table>
<thead>
<tr>
<th>Demographic characters</th>
<th>measures</th>
<th>PCOS group</th>
<th>Control group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age(years)</td>
<td>Mean ± SD</td>
<td>28.175 ± 5.8</td>
<td>30.03±7.5</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>17-43</td>
<td>17-45</td>
<td></td>
</tr>
<tr>
<td>BMI(Kg/m²)</td>
<td>Mean ± SD</td>
<td>31.9 ± 5.9</td>
<td></td>
<td>0.024’</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>22.4-51.8</td>
<td>18.3-50.4</td>
<td></td>
</tr>
<tr>
<td>RBS(mg/dl)</td>
<td>Mean ± SD</td>
<td>102.8 ± 16.2</td>
<td></td>
<td>0.045’</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>67-140 mg/dl</td>
<td>74-218mg/dl</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: The demographic characters of the two groups
Table 2: Comparison “between the 25(OH) Vitamin –D level” in both groups.

<table>
<thead>
<tr>
<th>Vit D Measures</th>
<th>PCOS group (N=80)</th>
<th>Control group (N=59)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level (ng/ml)</td>
<td>15.07± 8.78</td>
<td>14.2± 9.8</td>
<td>P value=0.58</td>
</tr>
<tr>
<td>Range</td>
<td>4 - 46</td>
<td>5-70</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deficiency(&lt;10ng/ml)</td>
<td>25 (31.25%)</td>
<td>17(28.8%)</td>
<td></td>
</tr>
<tr>
<td>Insufficient (10-29ng/ml)</td>
<td>48 (60%)</td>
<td>39 (66.1%)</td>
<td>The p-value is 0.63674.</td>
</tr>
<tr>
<td>Normal (30-100ng/ml)</td>
<td>7 (8.75%)</td>
<td>3 (5.1%)</td>
<td></td>
</tr>
</tbody>
</table>

“The chi-square statistic is; 0.9028. “The p-value is 0.63674. The result is not significant at p < .05”.

Low level “of Vitamin, D was observed, in the majority, of the”,women (91.25% “of patients” and 94.9% “of the “,control , “Table 2” ).The differences between all level of vit D of both group are not significant (the P value is 0.63 calculated using chi-square test).

Figure 1: The percentage of patient and control individuals that have normal, insufficient and deficient level of 25(OH) Vitamin –D.

Table 3 shows that there is (“no significant ,differences”) “in the levels of, Vitamin, D between obese ,and non –obese” PCOS patients as the P value is 0.4552 and the distribution of patients according to their Vitamin D levels is shown in figures 2 and 3 graded as deficient, insufficient and normal values.

Table 3: “The relation between level of 25(OH) Vitamin –D and BMI of PCOS patients”

<table>
<thead>
<tr>
<th>Grade of Vit D level</th>
<th>Obese PCOS patients (BMI ≥ 30) N=50(62.5%)</th>
<th>Non-obese PCOS patients (BMI&lt;30) N=30(37.5%)</th>
<th>The P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficiency</td>
<td>14(28%)</td>
<td>11(36.67%)</td>
<td></td>
</tr>
<tr>
<td>Insufficient</td>
<td>31(62%)</td>
<td>18 (60%)</td>
<td>P=0.4552*</td>
</tr>
<tr>
<td>Normal</td>
<td>5 (10%)</td>
<td>1 (3.33%)</td>
<td></td>
</tr>
</tbody>
</table>

*The chi-square statistic is 1.574. The p-value is 0.455203. The result is not significant at p < 0.05.*
**DISCUSSION**

“Vitamin D deficiency is” a universal health issue” and so is the PCOS in, reproductive, age females. “Insulin, resistance has” central role in “pathogenesis of PCOS”. Vitamin D may enhance insulin sensitivity, so its deficiency can promote and exaggerates the clinical features of PCOS. Various studies have been done over years to discover the association between vitamin D and PCOS. However, these studies have shown conflicting results. Till date there are no clear relationship, between “vitamin-D and PCOS” to be recorded.

In this case-control study; “levels “of vitamin, D in women with POC and healthy fertile, women” were, compared.

There was no statistical difference between vitamin D in PCOS patient compared with healthy females. Our finding is the same with Güdücü N, Görmüş U, Kutay S et al. (12) Panadis et al. (13) Moini et al. (14) and Figurová et al(15),but our finding is not agree with
Elida et al. (16), which found vitamin D measurements are higher in the control group “(women without PCOS)” than women with PCOS. The studies carried out by Ngo; et al. (16) and Mahmoudi; et al. (17) revealed a higher serum 25OH D “level in affected women. The current study showed no difference of vitamin D level with BMI in PCOS patients, our results agree with results of (a study carried out by Mazloomi; et al). (19)

This study suggests that there is no relationship between vitamin D and pathogenesis of PCOS. In addition; we found that, no, differences “between women with PCOS and control regarding serum vitamin- D; these study showed that vitamin _D deficiency is”a universal phenomenon”in both”PCOS patients and control.

CONCLUSIONS

According to our observation; there is”(no difference)”in the”absolute level ,of serum- vitamin- D "between women ”with PCOS” and ”matched controls”; and ”the role,of vitamin ““ in the pathogenesis of PCOS “ isn’t yet”clear.

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


14) Moini, A., Shirzad, N., Ahmadzadeh, M. et al. Comparison of 25-hydroxyvitamin D and calcium levels between polycystic ovarian syndrome and


Hypertension and Vitamin D Deficiency

Haider S. Al-Hadad¹, Ali Kadhum Neama¹, Ali Al-Mousawi¹
¹College of Medicine, University of Kerbala /Iraq

ABSTRACT

Vitamin D deficiency is gaining increasing attention as it is prevalent in all age groups, and all over the world. On the other hand, hypertension is attributed to multiple factors (including environmental factors) reacting with the genetic influence. An increased vascular tone is assumed to be a major predictor for hypertension and Vitamin D deficiency is intimately related to this predictor. The aim of this study is to disclose this association between vitamin D deficiency and hypertension and pave the way for other studies to look for the correction of vitamin D as a treatment modality in hypertension. A random sample of 72 hypertensive patients was selected from consultation clinic at Al Hussainy hospital in Kerbala/ Iraq in 2017. Patients with past medical history of chronic kidney or liver diseases and those on thiazide diuretics were excluded. The demographic data were documented and blood pressure was checked by mercurial sphygmomanometer. Vitamin D status was checked and also serum calcium was measured.

Results show that patients with a wide age range were included in the study with a mean of was 48.57 ± 14.26 year with a range extending between (15 -75 years), and females formed the majority (79.2%). The mean serum vitamin D level in the sample was 15.56 ± 8.72ng/ml, and the majority (80.6%) were deficient in vitamin D. Gender of the participant had no effect on vitamin D level (p=0.405), while comparison of means of serum vitamin D level between hypertensive and non-hypertensive showed significant difference of about 7.5 ng/ml. The mean of serum Calcium level in the sample was 8.69 ± 0.49 mg/ml which is normal.

Conclusion: There is significant correlation between vitamin D deficiency and hypertension, no effect of gender on vitamin D level, and age had no effect on vitamin D level.

Keywords: Vitamin D deficiency, Hypertension, blood sample, Kerbala.

INTRODUCTION

Hypertension is the first killer of human being globally, as it was responsible for deaths in 2015 which represents 13% of total deaths ¹, ². In addition, the prevalence of hypertension is increasing in a rapidly accelerating rates in both developed and developing countries, and the worldwide prevalence estimates for HTN may be as much as one billion ². In spite of the high prevalence and impact of hypertension, its etiology is still obscure and depends on theories and speculations. However, the main causes could be divided under two main domains: genetic and environmental factors ³. The pathogenesis is mainly related to higher peripheral resistance induced by increased vascular tone which is intimately related to calcium level in the blood ⁴.

On the other hand, vitamin D insufficiency/deficiency has been observed worldwide at all stages of life and is affected by several social and demographic characteristics. Its prevalence rises along with latitude, aging, sedentary lifestyle and limited sunlight exposure due to staying indoors ⁵, ⁶. Other possible factors influencing vitamin D difference are the use of sun block by females and breast-feeding in nursing mothers. Excess adipose tissue of females compared with males has been suggested as a causal factor to lower 25(OH)D concentrations in females. Mallah and his colleagues reported a strong correlation between the levels of 25(OH)D and clothing in Jordanian women ⁶. Also very high rates of vitamin D insufficiency found in women of child-bearing age living in Beijing and Hong Kong were detected ⁵. A lower serum 25(OH) D level was measured in Tunisia with lower mean level of veiled compared to no veiled women ⁷.

DOI Number: 10.5958/0976-5506.2019.00376.0
It has been characterized as a public health problem, since low concentrations of this vitamin have been linked to the pathogenesis of several chronic diseases (8).

Many studies in Iraq reported high prevalence of low level of vitamin D in healthy subjects (9). Vitamin D increases the absorption of calcium, so this may explain how vitamin D is related to hypertension (10-12). It has been shown that the incidence of hypertension in patients who are deficient in vitamin D is higher than in normal subjects (13, 14). Miller and Bernini and his colleagues found in randomized clinical trials found that if vitamin D is deficient, the level of both systolic and diastolic blood pressure were increased (15).

Even short-term severe vitamin D deficiency may directly promote hypertension and impacts on renin-angiotensin system components that could contribute to target-organ damage (16). Bernini and Thomas and their colleagues concluded that there was a negative correlation between vitamin D level and blood pressure (17, 18). On the other hand, some other studies failed to observe such an effect and reported that calcium plus vitamin D3 supplementation does not reduce blood pressure and the incidence of hypertension (19).

High level of vitamin D can directly reduce the secretion of the renin, probably through the influence of blood calcium levels, and lower blood pressure and this might be related to the widely distributed vitamin D receptors, so the cardiovascular system may be regulated indirectly by vitamin D level (3).

PATIENTS AND METHOD

A total 72 outpatients were randomly selected in a cross sectional study. The selection depended on systematic random sample for two groups (hypertensive and non-hypertensive groups) of patients at Al Husseiny hospital in Kerbala/ Iraq. All patients provide oral consent, and were interviewed in the outpatient clinic of Al Husseiny hospital in Kerbala/ Iraq between 21st November 2017 and 20th of December, 2017. The collected information included: age, gender and history of past medical conditions like hypertension, diabetes mellitus, chronic kidney disease and chronic liver disease.

Blood pressure was checked by mercurial sphygmomanometer, and was measured according to the standard methods which included measuring twice and in both left and right arm and taking the highest reading with one week interval between the measurements and while patient had rested for 5 minutes without previous smoking.

Blood samples (0.5 mL) were collected for measuring serum calcium and vitamin D and no tourniquet was used. For determining vitamin D status we depended on the following levels (vitamin D sufficient (25(OH) D $\geq 30$ ng/ml; vitamin D insufficient (25(OH)D 20-30 ng/ml; or vitamin D deficient (25(OH)D $<20$ ng/ml). The threshold of 20 ng/ml for vitamin D deficiency was lately recognized by the Institute of Medicine (IOM) (20).

More than one measurement and the mean of readings were recorded, and serum albumin measured and the serum calcium corrected for the albumin. Data of the patient were entered and analyzed using the statistical package for the social science (SPSS) version 24, IBM, US 2016. Analytic statistics performed using appropriate statistical tests like Pearson correlation between frequencies and independent t test to compare means at a level of significance at $P < 0.05$.

RESULTS

The mean age of patients in the sample was 48.57 ± 14.26 year with a range extending between 15 and 75 years. A wide age range was selected to overcome possible age effect. Females formed the majority of patients (79.2%), 55.5% of participants were above the age of 50 years. The mean of patients with hypertension was 50.1 ± 10.9 year, while the mean for non-hypertensive was 42.8 ± 15.7 year.

Forty patients (55.6%) enrolled in this study were hypertensive compared to 32 non hypertensive, and about 80.5% of the total participant suffered from vitamin D deficiency (with level of vitamin D less than 20 ng/ml). There was significant association between age and hypertension, the mean age of hypertensive was 54 year compared 41 year of non-hypertensive (table 1).
The mean serum calcium level in the sample was $8.69 \pm 0.49$ mg/ml and the mean serum vitamin D was $15.56\pm 8.72$ng/ml (figure 1). There was no gender difference in serum vitamin D level ($p=0.405$). Similarly, no gender difference was found in serum Calcium level ($p=0.407$).

**Table 1: Demographic characteristics of the participants in Al Husseiny hospital in Kerbala/ Iraq in 2017 (n=72)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>15</td>
<td>20.8</td>
</tr>
<tr>
<td></td>
<td>Male with HTN</td>
<td>6</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>Male without HTN</td>
<td>9</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>57</td>
<td>79.2</td>
</tr>
<tr>
<td></td>
<td>Female with HTN</td>
<td>28</td>
<td>38.0</td>
</tr>
<tr>
<td></td>
<td>Female without HTN</td>
<td>29</td>
<td>40.0</td>
</tr>
<tr>
<td>Age group</td>
<td>Below 30 year</td>
<td>8</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>30-39 year</td>
<td>11</td>
<td>15.3</td>
</tr>
<tr>
<td></td>
<td>40-49 year</td>
<td>13</td>
<td>18.1</td>
</tr>
<tr>
<td></td>
<td>50-59 year</td>
<td>20</td>
<td>27.8</td>
</tr>
<tr>
<td></td>
<td>60 year or more</td>
<td>20</td>
<td>27.8</td>
</tr>
<tr>
<td>History of Hypertension</td>
<td>Yes</td>
<td>40</td>
<td>55.6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>32</td>
<td>44.4</td>
</tr>
<tr>
<td>Vitamin D level</td>
<td>Vitamin D deficiency below 20ng/ml</td>
<td>58</td>
<td>80.5</td>
</tr>
<tr>
<td></td>
<td>vitamin D insufficiency (20-29ng/ml)</td>
<td>7</td>
<td>9.7</td>
</tr>
<tr>
<td></td>
<td>Vitamin D sufficiency &gt;30ng/ml</td>
<td>7</td>
<td>9.7</td>
</tr>
</tbody>
</table>

The mean serum calcium level in the sample was $8.69 \pm 0.49$ mg/ml and the mean serum vitamin D was $15.56\pm 8.72$ng/ml (figure 1). There was no gender difference in serum vitamin D level ($p=0.405$). Similarly, no gender difference was found in serum Calcium level ($p=0.407$).

**Table 2: The association of gender with Vitamin D and Serum Calcium level of participants in Al Husseiny hospital in Kerbala/ Iraq in 2017**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gender</th>
<th>Mean ± Std. Deviation</th>
<th>Frequency</th>
<th>Significance (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin D level</td>
<td>Male</td>
<td>$17 \pm 9.4$</td>
<td>15</td>
<td>0.467</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>$15.1 \pm 8.5$</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Serum Calcium</td>
<td>Male</td>
<td>$8.78 \pm 0.46$</td>
<td>15</td>
<td>0.407</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

using Pearson correlation there is no relation between vitamin D level and the age (table 2).

**Table 3: The Correlation of Vitamin D and serum Calcium with demographic characteristics of patients in Al Husseiny hospital in Kerbala/ Iraq in 2017**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Test</th>
<th>Hypertension</th>
<th>Vitamin D level</th>
<th>Age</th>
<th>Gender</th>
<th>Diabetes mellitus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin D level</td>
<td>Pearson Correlation</td>
<td>.434*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age in year</td>
<td>Pearson Correlation</td>
<td>.431*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Figure represent the distribution curve of vitamin D values in the sample population in Al Husseiny hospital in Kerbala/ Iraq in 2017.
**DISCUSSION**

Almost all women in Karbala governorate wear scarf (hijab) and are housewife with no outdoor activity resulting in limited sun exposure. The sun exposure to exposed face and hands in hijab outfitted females was suggested to be not enough for vitamin D synthesis \(^{(6)}\). The society in Iraq, like other eastern culture countries, is characterized by male dominance and dissimilarity in outdoor activities affects sun light exposure duration between male and female as male in Middle Eastern societies has more outdoor activities. This exposure difference is the main factor beside nutrition in determining vitamin D level. A study in Sulaimania/ Northern Iraq reported that over 79% of a sample of more than 1000 girls and women reported vitamin D level below the standard range \(^{(9)}\). Similar findings were reported in neighboring countries \(^{(6)}\), and other Arabic countries \(^{(7)}\), and south east Asia \(^{(5)}\), that showed significant difference attributed to different life style between male and female and difference in clothing. In the present study no significant association was found between gender and vitamin D level, this result might be related to the small sample size and high female proportion in the sample. Other possible reason may be related to that most participant were above the age of 40 years, and gender difference might need to be studied in younger age groups. It is important to mention that in middle and southern part of Iraq males wear head scarf especially people in rural areas which eliminate clothing as a factor. In this study there is no inquiry made about the indoor and outdoor activity and about diet so we recommend to enlist these parameters in future studies.
By Pearson’s correlation we didn’t notice any relation between the age and vitamin D level (table 6), and this result was not an expected result since elderly people are susceptible to vitamin D deficiency due to many risk factors, like reduced skin production of vitamin D with age, decreased sunlight exposure, decreased dietary intake, reduced skin thickness, impaired intestinal absorption, and diminished hydroxylation in the liver and kidney (21). Failure to demonstrate age effect on vitamin D level in the present study might be related to similar reasons mentioned above for gender difference. In comparison to previous studies done in Middle East countries, significant vitamin D level decline with age was seen in a study conducted on older persons in Saudi Arabia (22).

In comparison to other studies Krause et al used indirect method by using UVB irradiation to raise the level of 25(OH)D and he looked for the effect on patients with untreated hypertension, he found that increasing 25(OH)D levels associated with lowering of Bp. Other cross-sectional studies showed that BP was inversely and significantly correlated with 25(OH) D levels. A meta-analysis study done by Burgaz and his colleagues to look for the relationship between the level of 25(OH) D and HTN performed and in its analysis 4 prospective studies and 14 cross-sectional studies included. They found an inverse relationship between serum 25(OH) D concentration and HTN incidence (12). In 2013 Kunutsor and his colleagues (10), performed another meta-analysis to investigate vitamin D and risk of future HTN. The result of this meta-analysis suggested that the risk of HTN is reduced by 12% with a 10 ng/ml increase in blood 25(OH) D levels.

CONCLUSION

There is significant relation between vitamin D deficiency and hypertension, and no effect of gender on vitamin D level, and age had no effect on vitamin D level.

Limitation of the study

There is a need to look for other causes of hypertension, and should be included in the exclusion criteria, like the cause of the secondary hypertension, and family history should be inquired about to look for a genetic influence.

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. Parekhan, M., Jaff, BORKAF, K., Rachid, S.


The Role of Chlamydial Infection in Male Infertility

Jabbar S. Hassan¹, Reyam F. Salah², Ayad M. Gaidan²

¹Ph.D in Microbiology, College of Medicine/Al-Nahrain University/Baghdad/Iraq, ²Ph.D in Microbiology, College of Science/Tikrit University/Tikrit/Iraq

ABSTRACT

Background: Chlamydia trachomatis is an obligate intracellular bacterium most commonly associated with sexually transmitted diseases. In females, infection with this bacterium is well-documented as a cause of infertility. However, in males this effect is controversial. The aim of current study was to investigate the association of C. trachomatis infection in infertile male genital tract with some sperm parameters.

Method: This is a case-control study including 100 seminal fluid specimens from infertile men and other 100 specimens from fertile men as controls. Specimens from both groups were subjected for macroscopic and microscopic examinations. Bacterial DNA was extracted from each sample and 16S ribosomal gene of C. trachomatis was amplified with specific primers using conventional polymerase chain reaction (PCR).

Results: Seventeen specimens from infertile men were positive for C. trachomatis DNA versus one specimen from fertile men. A comparison of sperm quality between C. trachomatis-positive and -negative infertile men revealed a significant association between the presence of C. trachomatis in male genital tract and low sperms concentration and motility.

Conclusion: This study provided further evidence indicating that the motility and morphology of sperm are significantly influenced by the presence of C. trachomatis in male genital tract.

Keywords: Chlamydia trachomatis, sexually transmitted diseases, male infertility, prostatitis, sperm motility, bacterial DNA.

INTRODUCTION

Infertility is a common reproductive disorder affecting about 15% of couples worldwide [1]. Male infertility is believed to account for at least half of all cases of infertility. Although congenital, hormonal disorders, lifestyle, environmental hazards and psychological state are well-documented causes, the etiology of about 55% of male infertility is not obvious [2]. Infectious agent, especially bacteria, have a very important role in this regard. Of the most implicated bacteria are Neisseria gonorrhoeae, Treponema pallidum and Chlamydia trachomatis [3].

C. trachomatis is one of the most common causes of STDs in males and females, causing different genito-urinary tract pathologies such as urethritis, prostatitis, cervicitis, epididymitis, pelvic inflammatory disease (PID), tubal factor infertility and ectopic pregnancy [4]. The primary site for infection with C. trachomatis in males is the penile urethra from which the bacteria can ascend to the epididymis and testis [5]. In one study, such infection was found to be the most common cause of epididymitis compared to other STDs [6]. If the epididymis is involved, it will be a matter of time that orchitis and prostatitis are followed with subsequent canilicular system damage, testicular atrophy and obstructive azoospermia [7].

In a mouse model, [8] found that urethral inoculation of fertile male mice with 10⁶ C. trachomatis inclusion-forming units caused remarkable alterations in semen parameters, mostly included higher DNA fragmentation, increase mean percentages of necrotic spermatozoa and a reduction in the reproductive performance of these mice compared with controls. In human, many previous studies had addressed this issue; however, the results were inconsistence. So, this study was aimed to investigate the association of C. trachomatis with some sperm parameters and thus with male infertility.

MATERIAL AND METHOD

The Study Population
A case-control study was conducted during the period from July 2016 to February 2017 including 100 males with primary and secondary infertility who were attending Kamal AL-Samaraay Hospital/Baghdad, Iraq. Inclusion criteria were married adult males having unprotected intercourse without conception for at least 1.5 years. Exclusion criteria were known disturbance in hormonal levels, anatomical problems, such as varicocele and cryptorchidism, karyotyping abnormalities, a previous or ongoing treatment for fertility disorders and the presence of sperm defects of supposed genetic origin. Other 100 fertile males, without genito-urinary tract anatomical deformities or infection were recruited as controls. Clinical manifestations were determined by consultation of a sterility and urinary tract specialist and from verification of the information in the medical record. A written consent letter or verbal agreement was taken from all participants. The study was approved by the Institutional Review Board (IRB) at College of Medicine/Al-Nahrain University, Baghdad, Iraq.

**Samples collection and Processing:**

Seminal fluid specimens were collected from each subject in the laboratory by masturbation after 3-5 days of sexual abstinence. The ejaculate was deposited in a sterile wide-mouth screw-capped plastic container. The seminal fluid was examined according to World Health Organization (WHO) criteria. Liquefaction time, volume, color, viscosity and pH were assessed. All samples underwent microscopic examination under a phase contrast microscope to assess the following parameters:

Spermatozoa motility which was calculated as a percentage through observing the speed at which 200 sperms move with a flagellar movement. According to the type of movement, four grades were assigned:

- A: rapid progressive movement,
- B: Slow progressive movement,
- C: Non-progressive movement and
- D: no movement.

Sperm concentration was measured by haemocytometer.

The percentage and type of morphologically abnormal spermatozoa.

Identification of other cell types within the ejaculate.

**Bacterial DNA Extraction and Gene Amplification**

One hundred µl of seminal fluid specimen were used for bacterial DNA extraction using a ready commercial kit (DNA-sorb-B (Sacace/Italy) Kit) according to the manufacturer’s protocol. A specific pair of primers was used in conventional PCR to detect the presence of 16S ribosomal gene of *C. trachomatis* [11]. The forward and reverse primers were 5'-TGG CGG CGT GGA TGA GGC AT-3' and 5'-CTC AGT CCC AGT GTT GGC GG-3', respectively, with a fragment length of 300 bp. The reaction tube (GoTaq® Green Master Mix/Promega/USA) was set to contain 0.4µmol-l from each primer, DNA template (2ng), 4mmol MgCl2, Taq DNA polymerase (0.05µl), and dNTPs 0.4mmol each. Non-template negative control was used to validate the reaction. The tubes were placed in the thermo-cycler (Cleaver Scientific Thermal Cycler TC32/80) which was previously programmed with the following PCR conditions: 94°C for 5min followed by 40 cycles of 94°C for 20sec, 65°C for 20sec, and 72°C for 20sec, terminating in 72°C for 5min. Ten µL of PCR product were subjected to 1% agarose gel electrophoresis with ethidium bromide (0.5µg /ml; Sigma). Amplicon visualization was performed using an UV light transilluminator and then photographed using digital camera.

**Statistical Analysis**

Quantitative variables were expressed as mean-standard deviation (SD) and analyzed with student *t*-test while binomial variables were expressed as frequency and percentage and analyzed with Chi-squared test whenever possible. The statistical significant was set at P value ≤0.05.

**RESULTS**

**Seminal fluid characteristics**

Seminal fluid characteristics of the studied population were shown in Table (1). In all studied parameters with no exception, there were significant differences between fertile and infertile men. Interestingly, there were remarkable variations in most of these parameters in infertile men reflected by a relatively high standard deviation.
Table 1  Seminal fluids analysis between infertile and fertile men according to different parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Infertile</th>
<th>Fertile</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/ years (mean±SD)</td>
<td>28.92±5.9</td>
<td>27.73±3.9</td>
<td>0.095</td>
</tr>
<tr>
<td>Volume/ mL (mean±SD)</td>
<td>2.06±0.7</td>
<td>2.51±0.8</td>
<td>0.024</td>
</tr>
<tr>
<td>Motility% (mean±SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade A</td>
<td>1.31±4.2</td>
<td>45.15±7.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Grade B</td>
<td>5.95±8.9</td>
<td>20.97±3.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Grade C</td>
<td>18.25±12.1</td>
<td>15.44±3.5</td>
<td>0.027</td>
</tr>
<tr>
<td>Grade D</td>
<td>50.65±27.1</td>
<td>11.18±2.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Concentration× 10⁶ (mean±SD)</td>
<td>21.54±15.2</td>
<td>63.08±9.8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Abnormality% (mean±SD)</td>
<td>53.70±15.3</td>
<td>8.94±2.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pus cells, No.a/HPF (mean±SD)</td>
<td>1.26±2.8</td>
<td>0.39±0.2</td>
<td>0.003</td>
</tr>
</tbody>
</table>

SD: standard deviation, HPF: high power field

Molecular Detection of *C. trachomatis*

Gel electrophoresis of PCR product was shown in Figure (1). Out of 100 seminal fluid specimens from infertile men, 17 (17%) were positive for *C. trachomatis*. On the other hand, only one specimen (1%) from control group had positive result (P<0.001).

Figure 1  Gel electrophoresis of PCR products of *Chlamydia trachomatis* S ribosomal gene. P1,2,3,4,5,6,7,8: positive results with 300bp fragment length. Lane C: negative control.

Association of Chlamydial Infection with Seminal Fluid Parameters

The comparison between chlamydia-positive and –negative infertile men regarding seminal fluid characteristics was shown in Table (2). Both motility and abnormality were significantly affected by chlamydial infection. The percentage of grade C (no progressive movement of sperms) is higher in infected than non-infected men (19.79±13.1 versus 17.76±11.9, P=0.018; Table 2). In addition, the percentage of grade A (rapid progressive movement of sperms) was very low (0.79±0.62) compared with that in non-infected men (1.47±0.8) with a difference that was very close to significant (P= 0.059). The percentage of abnormal sperms was also found to be significantly different.
between infected and non-infected (43.13±15.1 and 53.88±15.4, respectively, P=0.034; Table 2).

Table 2 Association of chlamydial infection with seminal fluid parameters

<table>
<thead>
<tr>
<th>Variables</th>
<th>Infected (n=17)</th>
<th>Non-infected (n=83)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume/mL (mean±SD)</td>
<td>2.17±0.9</td>
<td>2.02±0.6</td>
<td>0.375</td>
</tr>
<tr>
<td>Motility %, (mean±SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade A</td>
<td>0.79±0.62</td>
<td>1.47±0.8</td>
<td>0.059</td>
</tr>
<tr>
<td>Grade B</td>
<td>5.42±3.9</td>
<td>6.12±4.2</td>
<td>0.038</td>
</tr>
<tr>
<td>Grade C</td>
<td>19.79±13.1</td>
<td>17.76±11.9</td>
<td>0.018</td>
</tr>
<tr>
<td>Grade D</td>
<td>51.46±26.4</td>
<td>50.39±27.5</td>
<td>0.868</td>
</tr>
<tr>
<td>Concentration×10^6(mean±SD)</td>
<td>20.96±14</td>
<td>21.72±15.6</td>
<td>0.831</td>
</tr>
<tr>
<td>Abnormality%(mean±SD)</td>
<td>43.13±15.1</td>
<td>53.88±15.4</td>
<td>0.034</td>
</tr>
<tr>
<td>Pus cells, No./HPF(mean±SD)</td>
<td>1.34±1.2</td>
<td>1.24±0.9</td>
<td>0.880</td>
</tr>
</tbody>
</table>

SD: standard deviation, HPF: high power field

**DISCUSSION**

Current study indicated the important role of *C. trachomatis* in affecting sperms morphology and progressive motility and thus male infertility. This indicates the involvement of prostate in chlamydia infection, because recent evidence suggested that prostatitis induced by *C. trachomatis* was associated with low sperm concentration and motility [12]. These results are comparable to a recent study conducted by [13] on Italian patients with chronic prostatitis. The authors found that beside human papillomavirus (HPV), *C. trachomatis* had a key role in male infertility especially that is associated with sperms motility and morphology. Many other epidemiological studies reported that the presence of *C. trachomatis* in male genital tract was significantly associated with low sperms concentration, viability and motility, as well as with an alteration in sperms morphology [12,14]. Moreover, [15] have linked the detection of *C. trachomatis* DNA in the semen with poor sperm motility. Furthermore, in a recent Iranian study including 1080 subfertile patients, [16] showed that sperms motility, concentration, and morphology were negatively associated with *C. trachomatis* infection. However, many other studies reported non-significant association between *C. trachomatis* infection of the male genital tract and altered sperms quality [17,18].

Several mechanisms have been proposed for this association between chlamydial infection and male infertility. *C. trachomatis* could affect the sperms either directly or indirectly. Direct impacts involve a contact of the pathogen or its soluble products with the sperms while indirect effects are believed to be through induction of inflammatory reaction accompanied with release of toxic mediators such as reactive oxygen species (ROS) and cytokines [19]. Interestingly, both proposed mechanisms were subjected for intensive investigation although with conflicting results.

In an in vivo study, [20] found that there was a small but significant reduction in the ability of sperms from chlamydia-positive men to undergo the acrosome reaction (an essential part of the process of fertilization) compared with sperm from men without an infection. Another study showed that lipopolysaccharide (LPS) of the bacteria can bind to CD14 on the sperm surface and induce ROS production causing marked reduction in sperms motility and even a caspase-mediated apoptosis [21]. Supporting these findings is a recent study by [22] who demonstrated through flow cytometry analysis that there was a significant increase in the activity of caspase-3 in semen of infertile men positive for *C. trachomatis*.

On the other hand, [23] studied the incidence of *C.
trachomatis infection among male partners of infertile couples and found that there were no differences in sperms concentration, motility and morphology between infected and non-infected men. More recently, [19] had in vitro incubated human sperms with C. trachomatis (serovar E or LGV) for 6 to 24h at 37°C, after which they analyzed several sperm quality parameters. Interestingly, they did not report any significant changes in sperms motility, viability, DNA fragmentation, ROS production, peroxidation level and mitochondrial potential compared to controls. These discrepancies in results can be attributed to several factors such as differences in experimental conditions, type and number of samples used and detection assay.

Noteworthy, detection of C. trachomatis in married males who failed to have conception does not only indicate the possible cause of this infertility, but also could serve as a marker for involvement of female partner in this infection. In this regard, sperms can transport C. trachomatis to the female genital tract [24] with induction of immune response against sperms in women [15]. Thus, even if there is no significant association of C. trachomatis with male infertility, there is no doubt that this pathogen can transmit to the female partner where there is a general agreement it has such notorious impact.

Despite the wide discrepancies about the possible effect of C. trachomatis on sperm, herein, we provide further evidence indicating that the motility and morphology of sperms are significantly affected by the presence of C. trachomatis in the male genital tract.

Acknowledgement: The authors highly appreciate the efforts of all staff in Al-Imamain Al-Kadhumain Medical City during samples collection.

Ethical Clearance: The study was approved by the Institutional Review Board (IRB) at College of Medicine/Al-Nahrain University, Baghdad, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare

REFERENCES

14. Pajovic B, Radojevic N, Vukovic M, Stjepcevic A. Semen analysis before and after antibiotic treatment


Protective Effect of Green Tea Against Poisoning with Malathion in Adult Rats

Saba Ibrahim Salih¹, Karem Kdaer Karem², Hutham Abd Ali Abd Alhussain¹, Alaa Adil Al-hindawi³
¹Department of Physiology and Pharmacology/College of Veterinary Medicine/University of Kerbala, Iraq, ²Department of Environmental Health, College of Applied Medical Sciences/ University of Kerbala, Iraq, ³Ministry of Health, Baghdad, Iraq

ABSTRACT

Background: Organophosphorus compound is one of the most various collections of insecticides. Malathion is one of the organophosphorus insecticides. These days, there is great emphasis on recognizing the power of natural products of plants as chemopreventive substances which are found in foods and used by human beings. Therefore, the aim of current study was to define the impact of green tea against side effects of malathion. Method: Animals were divided into 3 groups (6 rats in each group). First group was used as a control group. The second group was given malathion (50mg/kg/day; which is 1/50 of LD50 for two weeks). The third group was given malathion (50mg/kg/day) plus green tea (50mg/kg/day) for two weeks each. At the end of the second week the group treated with malathion showed reduced White Blood Cells (WBCs), Red Blood Cells (RBCs), concentration of Hemoglobin (Hb), Hematocrit (PCV) and platelets count in comparison with control group. However, there were significantly high serum levels of uric acid and creatinine in malathion group than control group. Also, there is significant increase in malathion plus green tea group than malathion group for the same hematological parameters except WBC count and significant decrease in the levels of uric acid and creatinine in malathion plus green tea group than malathion group. Conclusion: The present study recommended that using green tea is effective in decreasing the toxic effects of organophosphorus insecticides like malathion.

Keywords: Malathion, green tea, blood indices, uric acid, creatinine.

INTRODUCTION

Organophosphorus compound is one of the most various collections of insecticides. The wide usage of organophosphorus insecticides in human health and programs of agricultural subjects is accompany with dangerous effects on plants, animals, humans and environment (food, water, air and soil) which causes different degrees of poisoning [1].

The maximum effects of poisoning with organophosphate are its ability in decrease the level of cholinesterase in the animals’ nervous system [2]. By decreasing the level of cholinesterase, the organophosphate causes aggregation of acetylcholine within the nerve ends (synapses) that cause continuous stimulation [3]. Furthermore, organophosphates can take nicotinic receptors sites and result in muscle contraction and secretion of adrenaline [4].

Malathion is one of the organophosphorus insecticides which is used in houses and agricultural for the monitoring vectors of disease. It is a main reason of poisoning for the environment in developing nations [5]. Malathion toxicity is low in itself, but ingestion or absorption in the individual’s body causes its conversion to the very toxic metabolite, malaoxon (it is 61 times more toxic than Malathion itself [6]). Some research had improved the exposure for long time to malaoxon ingestion in rats [6]. Malathion is a lipophilic substance which enhances lipid peroxidation by interacting with the plasma membrane of the cell directly [7] and damages the membranes by causing lipid peroxidation.

These days, there is great emphasis on recognizing the power of natural products of plants as chemopreventive substances which are found in foods and used by human beings [8]. Tea is the most favorite drink consumed in the world. About three billion kilograms of tea are produced...
and used yearly. Green tea is preferred in China and Japan and first research on the advantage of green tea was done in these countries because it is a local tradition [8].

There are four types of tea, black, white, oolong and green tea. Green tea is produced from the plant known as *Camellia sinensis*. The minimum processed form of tea is white tea; whereas black tea leaves are exposed to fermentation. The green tea leaves are steamed so it preserves more polyphenols [9]. The benefits of green tea are referring to the presence of polyphenols and the catechins, which represent about 30% of the dry weight of green tea leaves. The catechins are found in large amount in green tea than in oolong tea or black tea, because of the differences in processing the tea leaves after harvest [10]. Green tea is a widely consumed beverage and for a long time it has been considered to have significant health-promoting effects [11]. Hematological studies are important in toxicology research because the blood is the main transport system in the body, and estimation of parameters of the blood commonly gives important information about the body response to all forms of injury especially toxic damage [12].

Aim of the study

The objectives of this study were to evaluate hematological and some biochemical parameters which may be changed due to malathion toxicity in white male rats. Also, to study the role of green tea in preventing or decreasing malathion poisoning.

MATERIAL AND METHOD

Animal of the study

Eighteen male rats (weighed approximately 165-180g) were housed in the animal building at the Faculty of Veterinary Medicine, University of Kerbala, at 22-24°C in a light/dark cycle of 12/12h. The food given was standard rat chow and water was freely given. Rats sheltered to the animal house for two weeks before starting the experiments.

Chemical

Commercial grade malathion has been obtained from the local market at 50% concentration, which is produced by Coromandal fertilizer limited, Ranipet, Vellore, India. Green tea was obtained from local market. Uric acid and creatinine kits were purchased from Spectrum, Egypt.

Design of experiment

Rats were divided into 3 groups of 6 rats each. Group 1 animals (Control group) were given normal saline 0.9% in a 0.2ml dose per animal through a feeding tube once daily for two weeks. Group 2 provided melatonin at a dose of 50mg/ kg bw/day in 0.2mL of distant water by feeding tube for two weeks as a group of malathion. This dose equals to 1/50 of the LD50 [13]. Group 3 was given the malathion at a dose of 50 mg/kg bw/day in 0.2ml of distal water per animal plus green tea at a dose of 50mg/kg bw/day in 0.2ml distilled water via feeding tube for two weeks [14].

By the end of two weeks of dosage, blood was obtained directly from the heart and divided into two samples. The first was collected in dry and clean tubes contain EDTA as an anticoagulant for the calculation of blood parameters which include White Blood Cells (WBCs), Red Blood Cells (RBCs) and platelets counts. In addition, Hemoglobin (Hb) concentration and Hematocrit (PCV) were measured, as well. The second blood sample was placed in special centrifuge tubes to get blood serum for determination of uric acid and creatinine.

Statistical analysis

Data were analyzed statistically by ANOVA with multiple tests compared to Duncan after using a computer-based statistical program (SPSS; version 22 for Windows, the United States of America). The differences were considered significant at P < 0.05.

RESULTS

At the end of study there was a significant decrease in RBC count, WBC count, Hb concentration, hematocrit, platelets count in the Malathion group compared to the control group. At the same time, there was a significant increase in malathion plus green tea group (group 3) compared to the malathion only group for the same parameters except WBCs (Table 1).
Table 1: Blood indices of the study animals after 14 days

<table>
<thead>
<tr>
<th>Parameters Groups</th>
<th>WBC (×10^3/µL)</th>
<th>RBCs (×10^6/µL)</th>
<th>Hb (gm/dl)</th>
<th>Hematocrit (PCV%)</th>
<th>Platelets (×10^3/µL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>15.150±0.3030a</td>
<td>5.2717±0.17708a</td>
<td>13.300±0.3296a</td>
<td>34.683±0.4483a</td>
<td>420.33±9.939a</td>
</tr>
<tr>
<td>Malathion (50mg/kg)</td>
<td>12.683±0.8830b</td>
<td>4.5233±0.16465b</td>
<td>12.133±0.1606b</td>
<td>29.483±1.5215b</td>
<td>326.67±3.981b</td>
</tr>
<tr>
<td>Malathion + green tea (50mg/kg)</td>
<td>13.017±0.6725b</td>
<td>5.1567±0.07320b</td>
<td>13.333±0.0989a</td>
<td>33.300±0.4082a</td>
<td>354.00±7.339a</td>
</tr>
</tbody>
</table>

Data were shown as Mean±Standard Deviation. Mean in the same column with different uppercase letters is significantly different at P < 0.05.

Other parameters showed significant increase (P<0.05) in creatinine and uric acid in malathion group as compared with control group and with malathion plus green tea group (group 3) as shown in Table (2).

Table 2: Serum uric acid and creatinine of the study animals after 14 days

<table>
<thead>
<tr>
<th>Parameters Groups</th>
<th>Serum creatinine (mg/dl)</th>
<th>Serum uric acid (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1.5552±0.60353b</td>
<td>3.7943±0.44466b</td>
</tr>
<tr>
<td>Malathion (50mg/kg)</td>
<td>6.6385±2.88712a</td>
<td>7.5567±0.36515a</td>
</tr>
<tr>
<td>Malathion (50mg/kg)+ green tea (50mg/kg)</td>
<td>1.0670±0.15090b</td>
<td>5.5917±0.69486b</td>
</tr>
</tbody>
</table>

Data were shown as Mean±Standard Deviation. Mean in the same column with different uppercase letters is significantly different at P < 0.05.

DISCUSSION

Our results showed that there were no clinical signs in the first group (control group) while the signs of diarrhea appeared in some cases in the second group may be due to the insecticide causing intestinal inflammation, as some cases have shown lamination in the second week that may be due to organophosphorus pesticides. The latter were known to stimulate toxicity in mammals by inhibition of cholinesterase enzyme which leads to accumulation of acetylcholine and subsequent activation of cholinergic receptors; muscarinic and nicotinic [7,15]. The cause of lameness may be due to weakness resulting from diarrhea and there were no deaths due to low dose of malathion [16]. The reason for these results could be poor absorption and metabolism of food substances resulting from inflammation of the intestine which is described as diarrhea [15].

Blood indices provide an important and quick diagnosis to study the toxic effects on body tissues. Blood parameters are often influenced by stress and other factors such as environmental factors [17].

The results of the malathion group showed a significant reduction in the number of red blood cells, hemoglobin concentration, PCV%, platelets and white blood cells count compared to the control group. This reduction can be referred to the deep cellular toxic effects of organic phosphorous pesticides. In this study, a significant reduction in the number of erythrocytes may be due to hemolysis and shrinkage of blood cells by the toxic effects of insecticides. Also, organophosphorus has bonds of oxons which are highly toxic compounds and can interactively destroy each major component in the cell such as carbohydrates, fats and DNA [18]. In addition, possibly pesticides causing inflammation of
the intestines that cause thickness and short bowel fluff with leukocytes infiltration and presence of fibrous tissues in the mucous membrane and submucosa that cause gastrointestinal malabsorption of nutrients [19]. Moreover, the reduced number of erythrocytes leads to a decrease in Hb concentration [20]. The reason may be the release of immature cells from the blood-forming tissues in the bone marrow as well as a disturbance in iron metabolism which leads to defective hemoglobin synthesis [21].

A decrease in the number of leukocytes may be due to an imbalance in the sites of white blood cells formation in the bone marrow, the disease is known as leukopenia [22].

On the other hand, in the treatment group, which was treated by malathion and green tea, there was a significant increase in the number of erythrocytes, concentration of hemoglobin, hematocrit and platelets in comparison with the malathion group which can be referred to the catechins of the green tea that has useful effect on the health like their antioxidant activities [23].

Many of the pesticides may be toxic and harmful for renal tissue [24]. The kidneys are one of the important organs that are attacked by organophosphorus compounds. So that, uric acid and creatinine tests of kidney function are vulnerable to pesticides poisoning [25-27].

This study showed a significant increase in serum uric acid in the malathion group which may be associated either with an increase in breaking down of protein or toxicity of malathion on the kidney [28]. However, in the groups treated with malathion as well as green tea there was a significant reduction of serum uric acid and creatinine compared to the group of malathion because green tea has reduced renal retrogression and caused the disappearance of cortical necrosis in the tissues of the kidney. This can be referred to the protection of phosphorylation and activation of endothelial nitric oxide compositions in endothelial cells by modification of protein kinase C, a signaling pathway(s) by green tea resulting in endothelium-dependent vasorelaxation [15, 29].

**Ethical Clearance:** It was obtained from the Scientific Research Committee at Faculty of Veterinary Medicine, University of Kerbala, Iraq.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**REFERENCES**


Burdens on Caregivers of Children with Down Syndrome in Middle Euphrates Region of Iraq

Esraa Shaker Al-Bahadli¹, Murtadha Ghanim Adai¹

¹Faculty of Nursing/Kufa University, Najaf, Iraq

ABSTRACT

Background: Down syndrome (DS) is the most frequent chromosomal disorder resulting from chromosome 21 trisomy. The demands on the family of children with DS are significantly higher, because the family must actively participate in the care of the child due to the delay in development, the limitations in activities of daily living related to self-care such as dressing, personal hygiene, walking and talking, and aspects related to health, education and leisure. Objectives of the study were to assess the burdens of caregivers of children with Down syndrome and to find out the relationship between burdens of caregiver and their demographic characteristics.

Method: A descriptive cross-sectional design study was carried out in the institutes of special needs in middle Euphrates region of Iraq. A probability (cluster) sampling method was used to select 100 caregivers. The study was carried out from 18th February to 22nd June 2018. Results: Down syndrome occurred in male more than female children who get care mostly from female caregivers. Economic and physical burdens had high scores burden evaluations in all studied cities. Older age of caregiver had great burden evaluation. Caregivers with high socioeconomic status had great burden evaluation in all studied provinces. Conclusion: the Caregivers of Down syndrome children are impacted by psychosocial, physical, emotional and physical burdens at high to moderate leves.

Keywords: Psychological burden, Down Syndrome, caregivers, correlation, socioeconomic status, training session.

INTRODUCTION

Down syndrome (DS) is the most frequent chromosomal disorder resulting from chromosome 21 trisomy [1] with an estimated incidence of 1/600 to 1/1000 live births worldwide and a higher risk at advanced maternal age [2].

Recent Brazilian data indicated that, on average, for every 600 to 800 births a child with DS is born regardless of ethnicity, gender or social class. The presence of intellectual disability occurs with varying degrees in those individuals [1].

The demands on the family of children with DS are significantly higher, because the family must actively participate in the care of the child due to the delay in development, the limitations in activities of daily living related to self-care such as dressing, personal hygiene, walking and talking, and aspects related to health, education and leisure. The presence of chronic diseases such as congenital heart defects, hypothyroidism and immunological disorders can influence multiple aspects of caregivers’ lives leading to fatigue, isolation, burden and stress [4,5].

The burden results from a disturbance in addressing the individual’s physical dependence and intellectual disability, the focus of attention and care. The objective aspects of caregiving burden include routine changes, compromised social and professional life, financial loss, overwork and supervising problematic behaviors of the individual being cared for. On the other hand, the subjective aspects of this burden are related to the caregiver’s perception, expectations as well as positive and negative thoughts. Symptoms of anxiety and depression were reported by caregivers of individuals with intellectual disabilities [1].
As a consequence, there is a lot of burdens on caregivers of children with DS like psychological, physical, economic and emotional burden[7].

They appear to be at high risk for depression, stress, anxiety, tiredness, low economic level and distress. Also, many caregivers have managed to overcome the constant challenge by using their patience and take the consequences to adapt well in the face of adversity [8].

Problem statement

Burden on caregivers of children with down syndrome in middle Euphrates region of Iraq.

Objectives of the study

1. To assess the burdens on caregivers of children with Down syndrome.

2. To find out the relationship between burdens on caregivers and their demographic characteristics.

Methodology

Study design

A descriptive cross-sectional design was adopted in current study to achieve the study objectives.

Setting of the Study

The study was conducted at AL-Raja Institutes in Karbala, Najaf, Qadisiyah and Babylon cities where the facilitation of the task was presented to the responsible managers and the children of Down syndrome were met. These institutes are governmental except for Karbala private institute is which affiliated to the Holly AL-Attabah AL-Abassiyah. All these institutes are located in the center of the corresponding cities.

Results

Table 1) showed that the study subjects overall high response to assessment of domains in all governorates, expect in AL-Najaf where there was moderate response to assessment.

Table (2) showed that there is a non-significant correlation between living area (in the four governorates included in the study) of children with DS and their demographic data, expect the significant correlation with age group in AL-Najaf (P value was 0.017) and in Babylon (P value was 0.037). Also, there was significant correlation with gender in AL-Qadisiyah governorate (P value was 0.013) (Table 2).

Table (3) revealed that there was non-significant correlation between living area (in the four governorates included in the study) of caregivers with their demographic data, expect the high correlation with age and socioeconomic status of caregivers in AL-Najaf (P values were 0.005 and 0.005, respectively). Also, there was significant correlation with participation of caregivers in training sessions in AL-Qadisiyah governorate (P value was 0.008) (Table 3).

Table 1 Statistical assessment of overall domains

<table>
<thead>
<tr>
<th>Overall</th>
<th>Karbala</th>
<th>Qadisiyah</th>
<th>Najaf</th>
<th>Babylon</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>%</td>
<td>MS</td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td>L</td>
<td>7</td>
<td>28</td>
<td>H</td>
<td>13</td>
</tr>
<tr>
<td>M</td>
<td>18</td>
<td>72</td>
<td>2.80</td>
<td>18</td>
</tr>
<tr>
<td>H</td>
<td>18</td>
<td>72</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

L: Low, M: Moderate, H: High, F: Frequency, MS:Mean of score, (mean of score ≤ 1.6: Low, mean of score: 1.7-2.3: Moderate, mean of score 2.4 and more: High), A: Assessment.
## Table 2 Correlation between living area of children with DS and their demographic data

<table>
<thead>
<tr>
<th></th>
<th>Karbala</th>
<th>Qudesia</th>
<th>Najaf</th>
<th>Babylon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age groups</strong></td>
<td>Chi-square</td>
<td>.907</td>
<td>.534</td>
<td>8.120</td>
</tr>
<tr>
<td></td>
<td>df</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.341 (NS)</td>
<td>.766 (NS)</td>
<td>.017 (S)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>Chi-squared</td>
<td>2.138</td>
<td>8.689</td>
<td>2.224</td>
</tr>
<tr>
<td></td>
<td>df</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.144 (NS)</td>
<td>.013 (S)</td>
<td>.329 (NS)</td>
</tr>
<tr>
<td><strong>No. of child</strong></td>
<td>Chi-squared</td>
<td>3.656</td>
<td>12.051</td>
<td>10.421</td>
</tr>
<tr>
<td></td>
<td>Df</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.301 (NS)</td>
<td>.061 (NS)</td>
<td>.108 (NS)</td>
</tr>
<tr>
<td><strong>Sequence of child</strong></td>
<td>Chi-squared</td>
<td>.289</td>
<td>2.149</td>
<td>5.164</td>
</tr>
<tr>
<td></td>
<td>Df</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.866 (NS)</td>
<td>.708 (NS)</td>
<td>.271 (NS)</td>
</tr>
<tr>
<td><strong>Age of diagnosis</strong></td>
<td>Chi-squared</td>
<td>.529</td>
<td>.482</td>
<td>1.963</td>
</tr>
<tr>
<td></td>
<td>Df</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.467 (NS)</td>
<td>.786 (NS)</td>
<td>.375 (NS)</td>
</tr>
<tr>
<td><strong>Any cases from father</strong></td>
<td>Chi-squared</td>
<td>1.852</td>
<td>1.216</td>
<td>.570</td>
</tr>
<tr>
<td></td>
<td>Df</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.174 (NS)</td>
<td>.544 (NS)</td>
<td>.752 (NS)</td>
</tr>
<tr>
<td><strong>Any cases from mother</strong></td>
<td>Chi-squared</td>
<td>.405</td>
<td>.381</td>
<td>2.249</td>
</tr>
<tr>
<td></td>
<td>df</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.524 (NS)</td>
<td>.827 (NS)</td>
<td>.325 (NS)</td>
</tr>
<tr>
<td><strong>Health problems</strong></td>
<td>Chi-squared</td>
<td>.446</td>
<td>.557</td>
<td>2.297</td>
</tr>
<tr>
<td></td>
<td>Df</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.504 (NS)</td>
<td>.757 (NS)</td>
<td>.317 (NS)</td>
</tr>
<tr>
<td><strong>Drugs</strong></td>
<td>Chi-squared</td>
<td>5.000</td>
<td>.750</td>
<td>3.080</td>
</tr>
<tr>
<td></td>
<td>df</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.082 (NS)</td>
<td>.386 (NS)</td>
<td>.214 (NS)</td>
</tr>
</tbody>
</table>
Table 3 Correlation between living area of caregivers and their demographic data

<table>
<thead>
<tr>
<th></th>
<th>Karbala</th>
<th>Qadisiyah</th>
<th>Najaf</th>
<th>Babylon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age/ year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-squared</td>
<td>2.528</td>
<td>2.869</td>
<td>10.609</td>
<td>3.105</td>
</tr>
<tr>
<td>Df</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Sig.</td>
<td>.112 (NS)</td>
<td>.238 (NS)</td>
<td>.005 (HS)</td>
<td>.078 (NS)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-squared</td>
<td>2.679</td>
<td>.557</td>
<td>.962</td>
<td>.</td>
</tr>
<tr>
<td>Df</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>.</td>
</tr>
<tr>
<td>Sig.</td>
<td>.102 (NS)</td>
<td>.757 (NS)</td>
<td>.618 (NS)</td>
<td>.</td>
</tr>
<tr>
<td><strong>Who is the caregiver?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-squared</td>
<td>3.002</td>
<td>3.691</td>
<td>.962</td>
<td>.</td>
</tr>
<tr>
<td>Df</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>.</td>
</tr>
<tr>
<td>Sig.</td>
<td>.223 (NS)</td>
<td>.718 (NS)</td>
<td>.618 (NS)</td>
<td>.</td>
</tr>
<tr>
<td><strong>Socio-Economic Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-squared</td>
<td>1.480</td>
<td>8.753</td>
<td>14.744</td>
<td>.806</td>
</tr>
<tr>
<td>Df</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Sig.</td>
<td>.477 (NS)</td>
<td>.068 (NS)</td>
<td>.005 (HS)</td>
<td>.369 (NS)</td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-squared</td>
<td>.198</td>
<td>2.007</td>
<td>2.214</td>
<td>.</td>
</tr>
<tr>
<td>Df</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>.</td>
</tr>
<tr>
<td>Sig.</td>
<td>.656 (NS)</td>
<td>.367 (NS)</td>
<td>.331 (NS)</td>
<td>.</td>
</tr>
<tr>
<td><strong>Training section</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-squared</td>
<td>.233</td>
<td>9.758</td>
<td>2.214</td>
<td>.329</td>
</tr>
<tr>
<td>Df</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Sig.</td>
<td>.629 (NS)</td>
<td>.008 (HS)</td>
<td>.331 (NS)</td>
<td>.566 (NS)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Current study showed that most of participants were within age-group (≤10) years old. Concerning the gender, most of study participants were males. This result is in agreement with state in Iraq as males are more than female according to authors’ opinion. Regarding the number of children, the study observed that children number (3-4) is high, this agreed with study of [9]. However, the study found that the sequence of a child with DS was always the first birth more than others. This agreed with study [10]. In addition, the study observed that the age at diagnosis was more than one month, this agreed with [11]. In the sample studied no case had come from father or mother, this agreed with [9]. In the sample studied, it was observed that most of children of the study group reported being affected by some health problems. This result was in accordance with a study by [12]. Also, current study showed that children with health problems were taking more than one drug, this agreed with [9].

The study results revealed that the highest percentage of caregivers were more than 31 years old. This result agreed with the result of the study done by [13,14].

Regarding to socio-economic status, most of the study subjects were with moderate socio-economic status. This result was in agreement with [9] who stated
that the most of their study subjects were with moderate socio-economic status. About the residence, the result of the study indicated that the highest percentage of caregivers was living in urban areas. This result was in agreement with [8] who reported that the place of the caregivers was urban. Regarding training sessions, the result indicated that caregivers who did not undertake a training session were more than the trained caregivers, this finding was in agreement with [8].

Furthermore, Tables (2) showed that assessment of emotional domain is high. The outcome is consistent with [15] where all of them mentioned that the overall assessment of emotional domain is high. However, the assessment of the physical domain showed that high in assessment, this agreed with [15].

This study is also showed that the burden on caregivers of children in the studied Iraqi cities was high, except in AL-Najaf where it was moderate. According to the researcher and according to the note through the collection of the sample where it was noted that the turnout of children’s enrollment and significantly Najaf in addition to that the wages taken were very simple and symbolic in addition to the availability of transport and access to the most areas in the province. In addition, most of AL-Najaf women were housewives and the parents were assigned to the time factor of interest to children exists in addition to the material situation is affordable.

It is noteworthy that most of the previous studies showed the existence of psychosocial, physical, economic and emotional burdens. Current study showed that there is significant relationship between age group and domains in AL-Najaf and Babylon cities while in AL-Qadisiyah there was significant relationship between gender and domains. This agreed with study of [17]. However, current study showed that there were no relationships between domains and number of children, sequences of the child, age of diagnosis, any case from father and mother, health problems or drugs. These findings agree with study of [18].

Furthermore, the study revealed that there is highly significant relationship between age group, socioeconomic state, training sessions with domains, this agreed with studies of [15,19]. While there was no significant relationship between gender, residence and who was care giving. This agreed with study of [20].

CONCLUSIONS AND RECOMMENDATIONS

Down syndrome occurred in male more than female children who get care mostly from females caregivers. Economic and physical burdens had high scores burden evaluations in all studied cities. Older age of caregiver had great burden evaluation. Caregiver with high socioeconomic status had great burden evaluation in all studied provinces. The researchers recommended that the national and governmental organizations need to design supported programs and life-long financial help that should be planned not only for the DS children but also for their families. Counseling units can be established in the primary care centers for coordinating their services to the DS children and their families especially for old caregivers. Further studies are needed to explore the association of stress and psychological status with care giving burdens. Finally, we recommended educational unit in primary care centers to provide care giving programs for managing their burdens independently. Ethical Clearance: Permission to conduct the study was obtained from the authorities at AL-Raja Institutes in Karbala, Najaf, Qadisiyah and Babylon cities, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

REFERENCES

4- Irving CA, Chaudhari MP. Cardiovascular abnormalities in Down’s syndrome:spectrum, management and survival over 22 years. Arch Dis Child 2012; 97(4): 326-330
5- Areias CM, Sampaio-Maia B, Guimaraes H, Melo P, Andrade D. Caries in Portuguese children with


A Biological Study on Some Causes of Dental Caries and Methods of Treatment and Prevention

Hamed Ibrahim Mohammed¹, Hassanain jwad abid al Hussein¹
¹Collage of Dentistry/ Kerbela University, Iraq

SUMMARY

The research includes a biological study on the most important factors that are responsible for tooth decay by providing the appropriate environment for the growth of bacteria causing this decay. These factors include (but not limited to) bacteria specifically Streptococcus mutans and Lactobacilli, Carbohydrates (such as sucrose) and time (time on decay). In addition, the study discussed the development of appropriate solutions to these problems, which affect the aesthetic of the human and make the natural appeal attractive to the individual, through the use of modern products dealing with diseases surrounding the mouth and teeth.

Keywords: Teeth decay, caries, enamel, fluoride therapy, composite filling, amalgam filling.

INTRODUCTION

When the hydroxyapatite of $H^+$ is combined with $H^+$ and the transformation of an $H_2O$ molecule is neutralized, the hydroxyapatite structure collapses to lose an $OH$ group. The acid in the teeth may be produced from eating a lot of citrus or by bacterial production of the acid after consuming food remnants, especially sugar. In addition, the outer layer of the tooth is stronger than the interior, therefore, the wands have difficulty expanding to the outer even if penetrated; instead, they disassemble, flourish and grow in the inner layer [1]. Today, caries is still one of the most common diseases around the world. Dental necrosis is a lesion that affects the tooth in the first place, and then reaches the level of the heart of the tooth in the advanced stage and causes inflammation first and then dies. Then after, it moves to the tissue surrounding the tooth causing abscesses or bags or even cell infections. Dental necrosis occurs due to several synergistic factors such as sugar, germs, host readiness and time. The time required for the development of necrotic lesion is very short in the absence of oral care for teeth cleaning and frequent exposure to foods containing sucrose, fructose and/or glucose [1-3]. Bottle-feeding of babies, especially at night, causes so-called baby bottle syndrome. Eating sweets in large quantities causes necrosis within a short period of time. In addition, the combination of bacterial plaque in the miazzibe and dental endotracheal caused to increases the risk of necrosis. Therefore, it is important to cover these mattresses with a cushion material. Saliva plays an important role in maintaining the balance of electrolytes on the surfaces of the teeth. Hence, it is important to pay special attention to patients who are taking drugs or undergoing treatment that may have an effect on salivation. The initial necrosis or initial reduction of the mineral elements of the port can be stopped by strengthening good oral health, avoiding sugar-containing foods and by using fluoride-cleaning.

CAUSES AND RISK FACTORS FOR TOOTH DECAY

The person who has tooth decay may not be aware of the disease [6]. The first indication of the new lesion is the appearance of white cilia on the surface of the teeth, indicating the area of attack on the enamel. This is referred to as a nasal necrosis [7]. The oral cavity, like other members of the body, contains many different types of bacteria. Some of these germs grow and multiply in an environment of foods or beverages that contain sugars or cooked starch, also known as fermented carbohydrates. When these carbohydrates are not removed by brushing the teeth, bacteria convert them into acids within 20 minutes. Bacteria, acids, food particles and saliva are transformed into a dental plaque which is a sticky layer covering the teeth. When the tongue is placed on the teeth, this plaque can be sensed only a few hours after cleaning the teeth. The dental plaque is somewhat rough in the tooth area (molars), especially along the gum line [8]. The acids formed in the dental plaque attack the...
minerals in the solid layer of the tooth called enamel, the outer layer that covers the tooth. The erosion of the “enamel” layer in the tooth leads to small holes in it, tooth decay. If parts of the “enamel” layer are eaten, germs and acids become able to reach the second layer of the tooth, called “ivory” (the middle layer of the tooth-Dentine). This layer is softer and less resistant to acids than the “enamel” layer. When tooth decay reaches this point, the pace and speed of tooth decay increase gradually. As this continues, germs and acids move into the layers of the tooth. It progresses into the dental pulp and the inner layer of the tooth leading to swelling and irritation.

In the very advanced stages of caries, the patient suffers from severe pain, excessive sensitivity in the teeth to gnawing and other symptoms. The body may react to such bacterial infiltration by sending white blood cells to fight the emerging inflammation. As a result, abscess may be formed in the tooth. This rotting process, however, takes quite a while.

Constant teeth are stronger than milk teeth and can inhibit the development of caries for one to two years. The saliva has only a partial role in the process of cleaning teeth from germs and acids. However, as the layers of age, one after the other, continue to decay, this process is accelerated more and more. The decay usually begins in the posterior area of the tooth, because it has more openings, gaps and curvature than other parts of the tooth. Although this structure helps to chew food a lot, it is also an excellent breeding ground for food scraps. Cleaning these incisions is also more difficult than cleaning the front teeth which are more accessible. As a result, the plaque is easily and quickly formed in the molars, where germs grow, produce acids and therefore bind to the “enamel” layer.

Tooth decay, as we have mentioned, is one of the most widespread health problems in the world and every person is at risk of tooth decay. There are several factors that increase the risk of tooth decay or the development of a condition of tooth decay.

Causes of teeth decay

There are four basic criteria needed to form tooth decay. These are:

1- The surface of the teeth (enamel), 2-Bacteria causing tooth decay,
3- Carbohydrates fermentation (e.g. sucrose) and 4-Time (time on decay).

Risk factors for teeth decay

Certain types of foods and beverages are more likely to cause decay than others. Fermented sugars are one of the main causes of teeth decay, because they stick to teeth for long periods of time. Fermented carbohydrates include all types of sugars and most types of cooked starch, such as milk, honey, sugar, soft drinks, raisins, cookies, hard candies, mouth fresheners, dried fruits and fried potatoes.

Excessive consumption of sweetened drinks

Mineral water: The addition of fluoride to drinking water helps reduce the spread of caries among people, because these minerals protect the layer of “enamel” in age. But nowadays, so many people are consuming mineral water or filtered water that does not contain fluoride, thereby losing the fluoride’s protection to their teeth. On the other hand, some mineral water may contain fluoride added to it as well as tap water which also contains fluoride resulting in excessive consumption of fluoride, especially by children. Therefore, it is advisable to consult a dentist about the amount of fluoride that should be consumed.

Certain diseases and disorders affect the teeth may expose the individual to a greater risk of teeth decay. The incomplete port formation, which occurs between 1 in 718 and 1 in 14,000 individuals, is a disease in which there is no complete form or forms in insufficient quantities and can occur outside the enamel of the teeth. In both cases, the teeth become prone to cavities because the enamel is unable to protect the teeth.

Older teeth complain of retraction.

Gingival dryness in the oral cavity: Dryness in the oral cavity indicates a lack of saliva. The latter plays a central role in preventing tooth decay. It rinses food residues and dental plaque from teeth. In addition, and the minerals in it help treat the early stages of tooth decay. Saliva limits the proliferation of germs that analyze and break up the enamel layer in the tooth or lead to inflammation of oral cavity. Saliva also neutralizes harmful acids in the oral cavity.

Nutritional Disorders: Anorexia or bulimia may lead to serious erosion of the tooth and decay. The
digestive acids that reach the mouth cavity caused by vomiting affect the teeth and lead to the erosion of the “enamel” layer. Nutritional disorders may also disrupt the production of saliva. In addition, some people suffer from eating disorders and frequent drinking of other soft drinks or acidic during the day, which is a permanent acidic shampoo of teeth.

Close contact: Some bacteria which can cause tooth decay may be passed from one person to another through kisses or using common eating utensils. Parents or people who are very close to children may also transmit these germs to them.

Caries and bacteria

The mouth contains a lot of bacteria and their different types, but is believed in a very simple amount that it may cause tooth decay which is often within Streptococcus mutans and Lactobacilli. These organisms can produce high amounts of lactic acid after fermentation of dietary sugars and they are resistant to negative effects of pH reduction \[2,3\].

It is a group that is believed to cause tooth decay and in particular root caries. In general, bacteria accumulate around the teeth and gums in a sticky mass called plaque which is a manifestation of the microbial bio-film.

Signs and symptoms of teeth decay

The cavity and tooth decay provide a cleft resembling two triangles with their meeting bases along the intersection with enamel and ivory. Caries begins without pain. The most important sign of the disease is calcification, especially in early months that indicates the onset of decay and manifested by appearance of grayish spots on the surface of the infected tooth in areas where the salivation process began. Over time, these spots turn into a hundred, her in the humble news in the mouth. Tooth decay does not cause any symptoms until it reaches an advanced stage. After that, the tooth becomes sensitive to the heat and cold and the sugar content.

Causes of teeth decay

1- The quality of food: the intake of starch and sugars frequently increases the rate of decay.

2- The number of times to eat food: the intake of sugars at frequent intervals with lack of care for the teeth from viscosity of food.

3- Types of starch: all types of starchy substances quickly turn into simple sugars by enzymes.

4- Carbohydrates: they contain all types of sugars and starch. Foods that contain starches include beans, bread types, rice, grains and prices of fame in addition to starchy products such as pasta, noodles and others that increase the child’s eating sweets, biscuits and chocolates between meals.

5- Unbalanced nutrition: iron deficiency, calcium and phosphorus deficiency of child’s food who does not take care of cleaning the teeth of the child to separate from the supernatural.

6- Composition of teeth: weak teeth are more likely to decay as a result of poor composition due to deficiency of some vitamins or minerals.

7- Shape of teeth: cracks and deep drilling facilitate accumulation of food wastes and bachelor.

8- Regularity of teeth in the jaw: the warping of teeth and regularity facilitate accumulation of food waste and bachelor, which increases the likelihood of decay.

9- Effects of saliva: saliva plays an important role in preventing decay and has a reverse performance on the components of the acid equation and reduces its ability to cause decay. Also, the more saliva production is, the lower is the decay rate.

Complications of dental caries

Tooth decay is so widespread that many people do not treat it with the proper seriousness. It is common that, for example, there is lack of interest in the injury of children teeth decay in milk teeth. However, dental caries can lead to serious complications and even in children whose teeth have not yet developed. Among these complications are abscesses in the teeth, teeth loss, broken teeth, chewing problems and acute infections. In addition, when dental caries reaches a stage where the aches are very severe, this may interfere with normal daily life to the extent that it prevents the student from going to school or to work. If the aches are severe and hinder the process of eating or chewing, they may lead to malnutrition and weight loss. If caries leads to tooth decay, this may negatively affect self-confidence. In some very rare cases, abscess caused by dental caries may lead to severe contamination that may endanger patient’s life if not properly treated.
Treatment of caries

The use of modern methods and techniques in cleaning teeth and polishing them in line with the development and progress of scientific and research and follow up the views of innovators and scientists. These include appropriate treatments to solve problems related to oral health and teeth, in particular the use of super pumice powder products, super pumice paste and nanodental liquid found in local markets for their benefit and support for teeth as well as leaving foreign products with negative effects of mouth and teeth. These treatments include:

Fluoride therapy

This is mode of treatment helps strengthen teeth against cavities or mild tooth allergies. Also, it strengthens the white teeth against necrosis (white teeth are approximately from 6 months to the end of year 13 of child’s age).

Composite filling or amalgam filling:

Treatment of the root of the tooth (or treatment of the nerve) is by cleaning it first and crushed with alabaster. Crown (full age cover used to repair damaged teeth).

Ethical Clearance: No clearance was required to conduct the study.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare

REFERENCES

Immunohistochemical Expression of CD26 in Bone Marrow Biopsies of Chronic Lymphocytic Leukemia Patients

Taymaa Moayed Ahmed¹, Abeer Anwar Ahmed²

¹Pathology Department/College of Medicine/ Mustansiriyah University, Baghdad, Iraq,
²Pathology Department/College of Medicine/ Mustansiriyah University, Baghdad, Iraq.

ABSTRACT

Background: Chronic lymphocytic leukemia (CLL) is the most frequent leukemia of adults in the Western world. Proliferation of lymphocytes in bone marrow, blood and lymphoid tissues causes heterogeneous clinical course. So, many efforts focus on finding reliable indicators that can help predict the outcome, or explain the clinical variability, of CLL. Expression of surface proteins such as CD38, CD49d and ZAP-70 on leukemic cells have been proven as a dependable prognosticator of poor outcome, other novel markers such as CD26 has been emerged, but it needs thorough assessment for their prognostic capacity in CLL. Current study was aimed to assess the Immunohistochemical expressions of CD26 in bone marrow biopsies of CLL patients and correlate it with clinico-pathological parameters. Method: Cross-sectional study was done on forty bone marrow paraffin blocks of untreated patients with CLL. Immunohistochemical staining for CD26 and CD38 antibodies were studied in relation to clinico-pathological details. Results: Expression of CD26 was seen in 60% of specimens which showed a moderate intensity in 91.6% and score (2) in 50% of cases. A significant association between CD26 and each of Binet stage C, Rai stage IV, Hemoglobin <10g/dl, and platelets count <100*10⁹/l was reported. Conclusions and recommendations: Immunohistochemistry can be used reliably to assess the expression of CD26 in CLL cases. It was significantly correlated with more advanced stage and poor prognostic signs. It is found that CD26 is more sensitive, specific and accurate than CD38 in prediction of high risk CLL patients (Binet stage C). We recommend further prospective studies related to therapeutic responses and assessment of CD26 expression in relation with other prognostic indicators.

Keyword: Chronic lymphocytic leukemia, CD26, CD38, immunohistochemistry, Binet staging, Rai staging.

INTRODUCTION

Chronic lymphocytic leukemia (CLL) is the most frequent leukemia in adults in Western world. The hallmark of CLL is the proliferation of mature clonal B lymphocytes in bone marrow, blood and lymphoid tissues. Clinically, it has tremendously heterogeneous course that is why testing new prognostic markers represents an attractive topic for researchers [1].

Expression of surface proteins such as CD38, CD49d and ZAP-70 on leukemic cells has been proven as a dependable prognosticator in many studies. At the moment, CD38 and ZAP-70 are widely used in the prognostic plan of CLL patients [1].

Other novel cell markers, such as CD26 Dipeptidyl-peptidase 4(DPP4), have been emerged as markers of poor outcome in CLL(3–6), but it still need thorough assessment for their prognostic capacity in CLL [¹]. The marker CD26 is a serine protease, involved in cleavage of inflammatory cytokines and chemokines, receptor activity, costimulatory functions and in apoptosis.

Current study was aimed to assess the Immunohistochemical expressions of CD26 in bone marrow biopsies of CLL patients and correlate it with clinico-pathological parameters.

SUBJECT AND METHOD

Cross-sectional study was intended which included forty bone marrow (BM) paraffin blocks from newly diagnosed CLL patients. These blocks were retrospectively collected at Teaching Laboratories of Medical City and National Center of Hematology in
Baghdad. These biopsies were related to the period from November 2016 to June 2018.

Related clinico-pathological details were obtained from hospitals archives. This was done after having a written permission from the authorities in the Teaching Laboratories of Medical City and National Center of Hematology in Baghdad to access all these data and specimens.

Immunohistochemistry (IHC) was used to detect and localize CD26 and CD38 in BM tissue sections of CLL cases. IHC technique was carried out using Rabbit polyclonal Anti-CD26 antibody [(ab28340), Abcam], Anti-CD38 antibody [(ab108403), Abcam] and secondary detection kit [Rabbit specific HRP/DAB (ABC) (ab64261), Abcam]. IHC protocol was done according to manufacturer’s instructions. Positive and negative controls were included in the work.

Positive results were indicated by distinct brown membranous precipitate of leukemic lymphocytes.[7] The immunohistochemical expression of CD26 and CD38 positivity was analyzed in a semi-quantitative scheme. This system depends on two variables; percentage of stained lymphocytes (scoring as 0: negative, 1: ≤10%, 2: 11-50% and 3: >50%) and intensity of staining (0: negative, 1: mild, 2: moderate and 3: strong).[8,9]

Statistical analysis

Data were analyzed using Statistical Package for Social Sciences (SPSS; version 25). Data were presented as mean, standard deviation (SD) and ranges. Categorical data presented by frequencies and percentages. Independent t-test (two tailed) was used to compare continuous variables among study groups accordingly. Pearson’s Chi–squared test was used to assess statistical association between different variables. A level of P<0.05 was considered significant.

To evaluate sensitivity, specificity and accuracy of immunohistochemical markers to predict advanced stages of CLL, we classified patients into low risk group (Binet stage A and B) and high risk group (Binet stage C).

RESULTS

General characteristics of patients

The total number of patients was 40 (27 males, 13 females) their age ranged from 28 to 75 years with a mean±SD of 57.18±11.27 years. The highest proportion of patients was > 60 years (52.5%). Most of patients (68%) were presented with both lymphadenopathy (LAP) and organomegaly.

According to Binet staging system, 60% of patients were in stage B, while 32.5% of them were in stage C and only 7.5% were in stage A. In the Rai staging system, 20% were stage I, 37.5% were stage II, 25% were stage III and only 17.5% were stage IV.

CD26 expression

Positive CD26 was detected in 60% of patients with moderate intensity in 91.6% of specimens and scored 2 in 50% of them (Table 1 and Figure 1).

Table 1 Distribution of CD26 marker details among study patients

<table>
<thead>
<tr>
<th>CD26 Marker Details</th>
<th>No. (n=40)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>24</td>
<td>60.0</td>
</tr>
<tr>
<td>Negative</td>
<td>16</td>
<td>40.0</td>
</tr>
<tr>
<td>Details of positive cases (n=24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intensity</td>
<td>(n=24)</td>
<td></td>
</tr>
<tr>
<td>Weak</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Moderate</td>
<td>22</td>
<td>91.6</td>
</tr>
<tr>
<td>Strong</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Scoring</td>
<td>(n=24)</td>
<td></td>
</tr>
<tr>
<td>Score 1</td>
<td>9</td>
<td>37.5</td>
</tr>
<tr>
<td>Score 2</td>
<td>12</td>
<td>50.0</td>
</tr>
<tr>
<td>Score 3</td>
<td>3</td>
<td>12.5</td>
</tr>
</tbody>
</table>
CD26 expression and its correlation with prognostic signs in CLL patients

The association between CD26 marker intensity and bad prognostic signs was shown in Table (2). The highest prevalence of moderate intensity was seen among patients with Binet stage C, Rai stage III, diffuse type of bone marrow involvement, hemoglobin level <10 g/dl and platelets count <100*10^9/l (92.3%, 90%, 76%, 92.3% and 85.8%, respectively) with a significant association between each of (Binet stage, Rai stage, bone marrow involvement, hemoglobin level and platelets count) (P= 0.007, 0.002, 0.01, 0.002, and 0.021, respectively) and the prevalence of CD26 marker intensity.

Table 2 Association between prevalence of CD26 marker intensity and prognostic signs

<table>
<thead>
<tr>
<th>Prognostic Signs</th>
<th>CD26 Marker Intensity</th>
<th>Total (%)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative (%) n= 16</td>
<td>Weak (%)  n= 1</td>
<td>Moderate (%) n= 22</td>
</tr>
<tr>
<td>Binet Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>3 (100.0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>B</td>
<td>13 (45.1)</td>
<td>0 (0)</td>
<td>10 (41.7)</td>
</tr>
<tr>
<td>C</td>
<td>0 (0)</td>
<td>1 (7.7)</td>
<td>12 (92.3)</td>
</tr>
<tr>
<td>Rai Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The association between CD26 marker scoring and bad prognostic signs was shown in Table (3).

### Table 3 Association between prevalence of CD26 marker scoring and prognostic signs

<table>
<thead>
<tr>
<th>Prognostic Signs</th>
<th>CD26 Marker Scoring</th>
<th>Total (%)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative (%)</td>
<td>Score 1 (%)</td>
<td>Score 2 (%)</td>
</tr>
<tr>
<td>Binet Stage</td>
<td>n= 16</td>
<td>n= 9</td>
<td>n= 12</td>
</tr>
<tr>
<td>A</td>
<td>3 (100.0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>B</td>
<td>13 (54.2)</td>
<td>5 (20.8)</td>
<td>5 (20.8)</td>
</tr>
<tr>
<td>C</td>
<td>0 (0)</td>
<td>4 (30.8)</td>
<td>7 (53.8)</td>
</tr>
<tr>
<td>Rai Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CD38 expression and its correlation with prognostic signs

Positive CD38 was detected in 77.5% of patients with moderate intensity in 80.6% of cases and score (1) in 51.6% of them.

The association between bad prognostic signs and CD38 marker intensity was shown in Table (4). The results showed that 69.2% of patients with moderate score of CD38 marker were in Binet stage C with a significant association between this bad prognostic sign and prevalence of CD38 marker intensity (P= 0.048).

It was obvious that there was no significant association between CD38 marker intensity and other prognostic signs.

### Table 4 Association between prevalence of CD38 marker intensity and prognostic signs

<table>
<thead>
<tr>
<th>Prognostic Signs</th>
<th>CD38 Marker Intensity</th>
<th>Total (%)</th>
<th>P- Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative (%) n= 9</td>
<td>Weak (%)  n= 1</td>
<td>Moderate (%) n= 25</td>
</tr>
<tr>
<td>Binet Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>3 (100.0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>B</td>
<td>3 (12.5)</td>
<td>1 (4.2)</td>
<td>16 (66.7)</td>
</tr>
<tr>
<td>C</td>
<td>3 (23.1)</td>
<td>0 (0)</td>
<td>9 (69.2)</td>
</tr>
<tr>
<td>Rai Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The association between CD38 marker scoring and bad prognostic signs was shown in Table (5). There was no significant association (P≥0.05) between CD38 marker scoring and any of the bad prognostic signs.

**Table 5 Association between prevalence of CD38 marker scoring and prognostic signs**

<table>
<thead>
<tr>
<th>Prognostic Signs</th>
<th>CD38 Marker Scoring</th>
<th>Total (%) n= 40</th>
<th>P- Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative (%) n= 9</td>
<td>Score 1 (%) n= 16</td>
<td>Score 2 (%) n= 14</td>
</tr>
<tr>
<td>Binet Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>3 (100.0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>B</td>
<td>3 (12.5)</td>
<td>11 (45.8)</td>
<td>9 (37.5)</td>
</tr>
<tr>
<td>C</td>
<td>3 (23.1)</td>
<td>5 (38.5)</td>
<td>5 (38.5)</td>
</tr>
<tr>
<td>Rai Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cont.. Table 5 Association between prevalence of CD38 marker scoring and prognostic signs

<table>
<thead>
<tr>
<th>Bone Marrow involvement</th>
<th>CD26 Marker Result</th>
<th>CD38 Marker Results</th>
<th>Total (%) n= 40</th>
<th>P- Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>Positive (%) n= 31</td>
<td>Negative (%) n= 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 (83.3)</td>
<td>4 (16.7)</td>
<td>24 (60.0)</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>1 (6.7)</td>
<td>6 (40.0)</td>
<td>7 (46.7)</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>2 (20.0)</td>
<td>4 (40.0)</td>
<td>4 (40.0)</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>2 (28.6)</td>
<td>2 (28.6)</td>
<td>3 (42.9)</td>
</tr>
<tr>
<td></td>
<td>Diffuse</td>
<td>3 (12.0)</td>
<td>8 (32.0)</td>
<td>13 (52.0)</td>
</tr>
<tr>
<td></td>
<td>Interstitial</td>
<td>4 (33.3)</td>
<td>7 (58.3)</td>
<td>1 (8.3)</td>
</tr>
<tr>
<td></td>
<td>Nodular</td>
<td>2 (66.7)</td>
<td>1 (33.3)</td>
<td>0 (0)</td>
</tr>
<tr>
<td></td>
<td>Hb level (g/dl)</td>
<td>&lt;10</td>
<td>3 (23.1)</td>
<td>5 (38.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥10</td>
<td>6 (22.3)</td>
<td>11 (40.7)</td>
</tr>
<tr>
<td></td>
<td>Platelets count/l</td>
<td>&lt;100*10⁹</td>
<td>2 (28.6)</td>
<td>2 (28.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥100*10⁹</td>
<td>7 (21.2)</td>
<td>14 (42.3)</td>
</tr>
</tbody>
</table>

Relation between CD26 and CD38 expression

There was no significant association (P= 0.44) between CD26 and CD38 markers (Table 6).

Table 6 Association between CD26 and CD38 markers

<table>
<thead>
<tr>
<th>CD26 Marker Result</th>
<th>CD38 Marker Results</th>
<th>Total (%) n= 40</th>
<th>P- Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive (%) n= 31</td>
<td>Negative (%) n= 9</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>20 (83.3)</td>
<td>4 (16.7)</td>
<td>24 (60.0)</td>
</tr>
<tr>
<td>Negative</td>
<td>11 (68.8)</td>
<td>5 (31.2)</td>
<td>16 (40.0)</td>
</tr>
</tbody>
</table>

Sensitivity, specificity and accuracy of CD26 Marker according to Binet staging system

The sensitivity, specificity and accuracy of CD26 marker were 100%, 59.3% and 72.5%, respectively, as shown in Table (7).
Table 7 Sensitivity, specificity and accuracy of CD26 marker

<table>
<thead>
<tr>
<th>CD26 Marker result</th>
<th>Binet Stage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Risk</td>
<td>Low Risk</td>
</tr>
<tr>
<td>Positive</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>Negative</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>27</td>
</tr>
</tbody>
</table>

Sensitivity, specificity and accuracy of CD38 Marker according to Binet staging system

The sensitivity, specificity and accuracy of CD38 marker were 76.9%, 22.2% and 40%, respectively, as shown in Table (8).

Table 8 Sensitivity, specificity and accuracy of CD38 marker

<table>
<thead>
<tr>
<th>CD38 Marker result</th>
<th>Binet Stage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Risk</td>
<td>Low Risk</td>
</tr>
<tr>
<td>Positive</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>Negative</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>27</td>
</tr>
</tbody>
</table>

DISCUSSION

The expression of CD26 in CLL patients was positive in 60% of cases and its expression intensity and scoring were significantly correlated with higher Binet and Rai stages. Moreover, CD26 expression showed a relationship with diffuse BM involvement pattern, lower Hb level and lower platelets count (Tables 2 and 3).

The marker CD26 thought to be a bad prognostic marker, comparable findings were mentioned by [3,5,10] who assessed CD26 by flow cytometry and identified it in 50%, 57.3% and 85.7% of CLL cases, respectively, and the CD26 expression was linked with more aggressive clinical picture [3,5,10]. However, [11], who assessed serum soluble level of CD26 (using ELISA) in CLL patients, did not notice any relation between CD26 level and Rai’s stages (P= 0.520) [11].

In the present study no association could be demonstrated between CD26 and CD38. This is parallel to what had been mentioned by [3] and in contrast to what concluded by [5,6,10]. This difference may be attributed to differences in sample size, ethnicity, environmental factors and different techniques.

The most remarkable finding in our work is that CD26 has been demonstrated to be more specific, sensitive and accurate to report high risk patients (Binet stage C) than CD38 (Tables 7 &8). Additionally, our data found that CD38 IHC expression intensity only correlates with Binet staging system, but did not correlate with Rai staging, Hb level, platelets count and histological type of CLL (Tables 4 &5). As a consequence, CD26 is proposed as a better marker than the well-established CD38.

In conclusion, the present study demonstrated the correlation between CD26 expression in CLL patients and bad prognostic signs. Moreover, we found that CD26 is more reliable than CD38 to remark high risk CLL patients.

Acknowledgement: The authors would like to thank Mustansiriyah University (www.uomustansiriyah.edu.iq) Baghdad-Iraq for its support in the present work.

Ethical Clearance: It was obtained from the Scientific Research Committee at AL-Najaf Health Directorate and AL-Kufa Technical Institute, Iraq.

Financial Disclosure: There is no financial disclosure.
**Conflict of Interest:** None to declare.

**REFERENCES**


9. Amir, Luma; Rasheed, Amir; Salman D. A Possible Role of EBV As a Progressive Factor in Patients with Chronic Lymphocytic Leukemia. Al-Mustansiriya Medical University 2016.


MicroRNAs 301a and 93 Biomarkers for Endometrial Cancer

Basim Shehab Ahmed1, Hussain Abady Aljebori2 and Israa Mehdi Al-sudani3

1Department of Pathology and Forensic Medicine/ Mustansiriyah University/College of Medicine, Iraq, 2Department of Pathology and Forensic Medicine/ Mustansiriyah University/ College of Medicine, Iraq, 3Ibn Sena University of Medical and Pharmaceutical Sciences/ Baghdad, Iraq

ABSTRACT

Background: Differentiation of endometrial hyperplasia with atypia from well-differentiated endometrial endometrioid adenocarcinoma in endometrial biopsies is a difficult task. The final diagnosis may be achieved after hysterectomy. Non-invasive methods are limited, but the new advances of molecular and tumor genetics, especially after discovery of microRNAs, have opened a new era in the diagnosis and management of tumors. MicroRNAs were found to target genes that control cell cycle, DNA repair, apoptosis, angiogenesis and so on. Therefore, aim of current study was to study expressions of microRNA genes, miR-93 and miR-301a, by qRT-PCR in samples taken from patients with endometrial endometrioid adenocarcinoma, endometrial hyperplasia with atypia and normal endometrial tissues. Methods: Participants were divided into three groups of 38 subjects each. Histopathological diagnosis of hysterectomy samples was performed as gold standard method. Small RNAs extracts were obtained by miRNeasy FFPE Kit – QIAGEN. Quantity and purity of small RNAs were determined by nanodrop spectrophotometer. Then, obtained amplicons were reverse transcribed into corresponding cDNAs and amplified in triplicates by qRT-PCR using TagMan® MicroRNAs amplification kit and primers from Applied Biosystems. The mean Ct values of each specimen were taken for statistical analysis and gene expression studies. Results: Data from current study showed significant overexpression of microRNAs-93 and miR-301a in samples taken from patient with endometrial endometrioid adenocarcinoma compared to atypical endometrial hyperplasia with sensitivity of 92.11% and 94.74%, for miR-301a and miR-93, and 97.36% for both genes, respectively. The specificity for both genes was 100. Accuracy, for miR-301a and miR-93, was 94.74%, and 97.36%, respectively, and for both genes was 92.11. Conclusion: Cases of endometrial biopsies with qRT-PCR expression of 1.5 or more of miR-301a and/or miR-93 genes are considered as well differentiated endometrioid endometrial adenocarcinoma. Cases with expression of <1.5 are considered as endometrial hyperplasia with atypia. Keywords: Endometrioid adenocarcinoma, endometrial hyperplasia with atypia, microRNA, microRNAs-93, miR-301a.

INTRODUCTION

Endometrial endometrioid adenocarcinoma (EEC) is a major cancer of female genital tract above age of 50 years [1]. It is prevalent in the range of 1.7 – 2.4 per 100000 of adult females per year [2]. Main risk factors for EEC include obesity, diabetes mellitus and pathological conditions associated with estrogen excess [2]. The differentiation between well-differentiated EEC and endometrial hyperplasia with atypia (EHA) is difficult, especially in small endometrial biopsies [3]. In order to reduce the number of unnecessary hysterectomies, studies were opened for finding of non-invasive methods. Recent advances in tumor genetics and molecular pathology revealed a central role for microRNAs in initiation, progression or inhibition of tumor by blocking action of oncogenes or tumor suppressor genes [4]. MicroRNAs exert their actions by inhibiting post-transcription translation of corresponding messenger RNAs (mRNAs) [4]. MicroRNAs are classified into oncogenes or tumor suppressor genes depending on their target mRNAs [5-7]. In endometrial carcinoma microRNAs were found to control many oncogenes and tumor suppressor genes especially PTEN, K-ras and TP53 which are involved in endometrial cancer initiation, progression or suppression [7-9]. Studies showed significant differences in the expression of microRNAs in cancerous endometrial
tissues compared to endometrial hyperplasia with atypia [8,9].

Therefore, present study was aimed to use expression of certain microRNAs as biomarkers to differentiate well-differentiated endometrial endometrioid adenocarcinoma (EEC) from endometrial hyperplasia with atypia (EHA) in order to reduce the number of unnecessary hysterectomies. The work based on studying the profiles of two microRNAs, miR-301a [9-11] and miR93 [11-13], in samples of known cases of endometrial endometrioid adenocarcinoma, endometrial hyperplasia with atypia and normal endometrial tissues.

PATIENTS AND MATERIALS

Specimens used in present work were taken from 114 patients (114 samples) participated in the study. Specimens were divided into three groups; 38 of well differentiated endometrial adenocarcinoma, 38 of endometrial hyperplasia with atypia and 38 of normal endometrial tissues as controls. Diagnoses of all specimens were confirmed by examination of sections from hysterectomy and endometrial specimens by three pathologists with full agreement on final diagnosis. Specimens of each group were consisting of 38 formalin-fixed and paraffin-embedded blocks (FFPE). Study was conducted in the Department of Pathology and Forensic Medicine at Al-Mustansiriya College of Medicine, Iraq. The work was approved by the Research Ethics Committee at Al-Mustansiriya College of Medicine. Patients were recruited at the Department of Gynecology and Obstetrics/Al-Yarmouk Teaching Hospital, Baghdad, for the period from October 2015 to May 2018.

METHOD

Histopathological diagnosis of hysterectomy samples was performed as gold standard method. MicroRNAs studies were performed on pieces from blocks of FFPE sections. Three punches taken from each FFPE block deparaffinized and small RNAs extracted were obtained by miRNasy FFPE Kit – QIAGEN [14]. Quantity and purity of small RNAs were determined by nanodrop spectrophotometer [15]. Then, obtained amplicons were reverse transcribed into corresponding cDNAs and amplified in triplicates by qRT-PCR using TagMan® MicroRNAs amplification kit and primers from Applied Biosystems [16]. The mean Ct values of each specimen were taken for statistical analysis and gene expression studies. Equation used for calculating expression was: Expression= \( \left( \frac{2^{-\Delta\Delta Ct}}{2} \right) \) [17].

The gene miR-22a was chosen as a housekeeping gene [18].

RESULTS

Expressions of miR-301a and miR-93 genes by qRT-PCR in samples taken from cases of endometrial hyperplasia with atypia were significantly low compared to samples taken from cases of endometrial endometrioid adenocarcinoma (P≤0.05; Table 1).

<table>
<thead>
<tr>
<th>No.</th>
<th>Endometrial Hyperplasia with Atypia (EHA)</th>
<th>Endometrial Endometrioid Adenocarcinoma (EEC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mir-301a</td>
<td>Mir-93</td>
</tr>
<tr>
<td>1</td>
<td>0.86</td>
<td>0.46</td>
</tr>
<tr>
<td>2</td>
<td>0.59</td>
<td>0.72</td>
</tr>
<tr>
<td>3</td>
<td>1.18</td>
<td>0.85</td>
</tr>
<tr>
<td>4</td>
<td>0.9</td>
<td>0.37</td>
</tr>
<tr>
<td>5</td>
<td>0.74</td>
<td>0.45</td>
</tr>
<tr>
<td>6</td>
<td>0.77</td>
<td>0.62</td>
</tr>
<tr>
<td>7</td>
<td>1.47</td>
<td>0.81</td>
</tr>
<tr>
<td>8</td>
<td>0.93</td>
<td>0.76</td>
</tr>
<tr>
<td>9</td>
<td>0.49</td>
<td>0.39</td>
</tr>
<tr>
<td>10</td>
<td>0.67</td>
<td>0.70</td>
</tr>
<tr>
<td>11</td>
<td>0.71</td>
<td>0.19</td>
</tr>
</tbody>
</table>
DISCUSSION

The studied microRNAs genes, miR-301a and miR-93, were successfully extracted and amplified from all specimens. The genes were highly expressed in most specimens taken from cases of endometrial endometrioid adenocarcinoma compared to endometrial hyperplasia with atypia (Table 1). The miR-301a and miR-93 genes were slightly expressed in samples taken from cases of endometrial hyperplasia with atypia compared to control cases, the expressions were <1.5. Accordingly, expression of 1.5 was adopted as a cut-off point between cases of endometrial endometrioid adenocarcinoma (EEC) and endometrial hyperplasia with atypia (EHA).

The sensitivity of test using miR-301a gene alone, miR-93 gene alone and both genes were 92.11%, 94.73% and 97.36%, respectively. The specificity of test was 100% for both genes as there were no false positive results. Accuracy of tests using miR-301a alone, miR-93 alone and both genes were 92.11%, 94.73% and 97.36%, respectively. Results from current work were in consistency with results from many other international studies. For example, Anna Torres et al. [18] found an accuracy of 95% in their study on microRNAs in tissues and plasma samples as biomarkers for endometrial endometrioid adenocarcinoma. In addition, Devor EJ et al. [19] studied the expression of five microRNAs genes in samples of endometrial carcinoma and reported significant high expression of genes in all samples. Also, Chung TK et al. [20] showed that high expression of miR-205 in cell line of endometrial cancer enhanced tumor cells proliferation whereas low expression resulted in tumor growth repression. Moreover, Lee JW et al. [21] in their study found that miR-200 family is overexpressed.
in endometrial adenocarcinoma.

CONCLUSION

Cases of endometrial biopsies with qRT-PCR expression of 1.5 or more of miR-301a and/or miR-93 genes are considered as well differentiated endometrioid endometrial adenocarcinoma. Cases with expression of <1.5 are considered as endometrial hyperplasia with atypia.

Recommendation

Further studies, with large sample size, large panel of microRNAs and/or use of non-invasive procedures of gene expression in serum and plasma samples, are highly recommended.

Ethical Clearance: Obtained from the Research Ethics Committee at Al-Mustansiriya College of Medicine, Baghdad, Iraq.

Source of Funding: Self-funded.

Conflict of Interest: Nil

REFERENCES


Serum levels of Anti-Mullerian Hormone, Leptin, T3, T4 and TSH in Women with Polycystic Ovary Syndrome in Iraq

Ibtisam Kareem Mohaisen

Department of Basic Medical Sciences/ College of Dentistry/ University of Misan, Iraq

ABSTRACT

Background: Endocrine abnormalities associated with polycystic ovarian Syndrome (PCOS) are essential problems. PCOS is a frequent trouble inflicting menstrual irregularity and infertility among women regarding effective age. Increased level of Anti-Müllerian Hormone (AMH) is presently considered an essential marker for PCOS. Aims of current study were to evaluate serum levels of AMH and to correlate them with age, BMI and serum levels of TSH, T3, T4 and leptin in females with PCOS as compared to normal controls.

Methods: Current study involved 120 females with PCOS belonging to age group (18-35) years from Misan City, Iraq. These patients were divided into three equal groups as follows: G1 (controls), G2 (females having PCOS and hyperthyroidism) and G3 (females having PCOS and hypothyroidism).

Results: Data from current study showed highly significant (P< 0.001) increase in age, BMI in G2 and G3 when compared with G1. Also, results showed non-significant increase in AMH in group G3 and G2 when compared with G1. The results also revealed significant increase in TSH, T3, and T4 in G2 and G3 compared with G1. In addition, there was highly significant increase in leptin hormone in G2 and G3 when compared G1. The results showed AMH was not related with age in G1 and patients groups. Also, there were non-significant correlations between BMI, TSH, T3 and T4 in G1 and patients groups. Also AMH showed negative correlation with leptin in G2, while non-significant positive correlation in control and G3.

Conclusion: PCOS women of fertile age have higher AMH, TSH, T3, T4 and leptin levels in patients groups than that of control. It can be considered as an important marker for the diagnosis of PCOS.

Keywords: AMH, PCOS, Thyroid hormones, Leptin, BMI, Pearson correlation.

INTRODUCTION

Polycystic ovary syndrome (PCOS), the most important endocrinopathy of females within the reproductive age, has a prevalence of 22% in accordance with 26% [1]. It is characterized by irregular unovulatory menstrual cycles, features of hyperandrogenism, and then PCOS [2]. Multiple endocrine derangements were described among patients with PCOS including abnormally excessive levels of FSH, LH, FSH/LH, prolactin, testosterone, estradiol and insulin resistance [3]. The patients with PCOS have risks of infertility, miscarriage and complicated pregnancy. A previous study revealed that the occurrence of oligo-ovulation or unovulation in patients with PCOS ranged from 65% to 80%. The most common complaint reported by patients with PCOS was infertility due to chronic unovulation [4].

Hyperandrogenism is the key factor of the pathophysiology responsible for the interruption of physiologic feedback mechanisms that is fundamental for the establishment of ovulatory cycles, which leads to chronic unovulation. An interesting recent review and meta-analysis confirmed that females of all ages with PCOS have an elevated risk of endometrial cancer but the risk of ovarian and breast cancer were not significantly elevated [5]. However, primary ovarian dysfunction, disorders of production, action of growth elements and Anti-Mullerian hormone (AMH) are other mechanisms related to possible changes in follicular recruitment and development [6]. Anti-Mullerian hormone AMH is a 140 KDa diametric glycoprotein hormone of transforming growth factor-β family. Its level in serum shows little fluctuations at some point of the menstrual cycle. Serum AMH level is represents a reliable marker on ovarian follicular pool. Since AMH level reflects the number
of growing follicles, its measurement may be used as a marker regarding ovarian follicular pool impairment in PCOS. In unovulatory females with PCOS, the follicular development is halted at 6-9 mm diameter. These elevated follicles contribute to the elevated AMH, as AMH production per granulose cell is also elevated \[7\].

PCOS shares common characterized with hypothyroidism like abnormal menses, unovulatory cycles, obesity, dyslipidemia and psychological disturbances. Recent research has shown an association between PCOS and thyroid dysfunction including changes in thyroid gland size \[8\]. PCOS with thyroid disease creates independent risks of ovarian malfunction as well as pregnancy-associated problems. Abnormal thyroid hormones concentrations could trigger alterations in ovulation and then menstruation. Initial levels of thyroid malfunction can result in delicate changes in ovulation as well as endometrial receptivity, which consequently may have drastic influence on fertility \[9\]. Thus, to reach the real diagnosis and to assess the AMH and thyroid function, free fraction of this hormone is essential.

Therefore this study was planned to assess AMH, TSH, T\(_3\) and T\(_4\) in patients with PCOS.

On the other hand, leptin is a cytokine that is produced by the white adipose tissue. It is a key hormone that participates in retaining energy homeostasis and weight through the determination of food intake and an elevated energy output \[10\]. Leptin decreases appetite, increases energy expenditure, and reduces the manufacturing of neuropeptide Y from the hypothalamus. Leptin may also have a major role in reproductive function, acting at many levels of the hypothalamic-pituitary-ovarian axis \[11\]. Circulating leptin levels have been positively related with body fat independent from PCOS according to some studies \[12\]. However, some studies have not shown significant differences in serum leptin concentrations in female with PCOS when compared with age- and BMI-matched controls \[13\].

**AIMS OF STUDY**

The aims of this study were to evaluate serum levels of AMH, in relation to age and BMI, leptin concentrations as well as thyroid hormones levels. In addition, the study will investigate the correlation between AMH levels and levels of the measured hormones.

**MATERIALS AND METHOD**

Current study recruited 120 females with PCOS belonging to age groups of (18-35) years from the city of Misan, Iraq. The detailed information regarding family background, personal history, dietary habits and physical activity of each subject was recorded. These patients were divided into three groups as follows: G1 (controls) consisted of 40 female and G2 consisted of 40 PCOS patients with hyperthyroidism and G3 consisted of 40 PCOS patients with hypothyroidism.

Venous blood sample (5 ml) was taken from each participants, allowed to clot, centrifuged and stored at -20\(^\circ\)C till the assay for AMH, using immunoassay analyzer (RD-Ratio Diagnosis GmbH/Germany) and following the manufacturer’s instructions. On the other hand, TSH, T3, and T4 were measured using enzyme linked fluorescent assay EIFA (BioMericux SAF/France) kits.

**Statistical analysis**

Statistical analysis of data was executed by SPSS (version 20). Student \(t\)-test was employed for calculating comparisons between groups. Results were considered statistically significant and highly significant at \(P<0.05\) and \(P<0.001\), respectively. Pearson correlation analysis was used to determine liner correlations between the variables and relationships between all measured parameters. Results were presented as Mean±Standard Deviation (SD).

**RESULTS**

Results of current study showed highly significant increase in age and BMI of participants in G2 and G3 when compared with G1 (controls). However, AMH levels were not significantly different among the three groups of study (Table 1, Figures 1 &2). The results also revealed highly significant differences in serum levels of TSH, T3, T4 and leptin in G2 and G3 as compared with G1 (Table 1, Figures 1&2). In addition, there was highly significant increase in leptin hormone levels in G2 and G3 when compared with G1.

The relationships between variables measured in this study were studied using Pearson’s correlation analysis. The analysis revealed no significant correlation between AMH levels and age, on the one hand, and between
AMH and BMI, on the other hand, within the three groups of study (Table 2, Figures 4).

In addition, data from current study revealed non-significant negative correlations between serum levels of AMH and those of TSH, T3, and T4 within the three studied groups (Table 2, Figures 3, 5 & 7).

On the other hand, current study showed non-significant negative correlation of AMH serum levels with those of leptin within G2 as compared with G1 (Table 2) However, there was non-significant positive correlation of AMH serum levels with those of leptin within G3 as compared with G1 (Table 2).

Table 1  Age, BMI and serum levels of AMH, TSH, T3, T4, and Leptin for participants of current study

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean±SD</th>
<th>P-value</th>
<th>Mean±SD</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G1</td>
<td>G2</td>
<td></td>
<td>G3</td>
</tr>
<tr>
<td>Age/ year</td>
<td>23.824 ± 4.270</td>
<td>33.021 ± 5.346</td>
<td>HS</td>
<td>36.187 ± 4.937</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>22.807 ± 3.546</td>
<td>35.494 ± 10.604</td>
<td>S</td>
<td>31.476 ± 7.450</td>
</tr>
<tr>
<td>AMH (ng/ml)</td>
<td>7.029 ± 3.391</td>
<td>13.208 ± 3.580</td>
<td>NS</td>
<td>8.238 ± 3.291</td>
</tr>
<tr>
<td>TSH (µUI/L)</td>
<td>1.872 ± 1.505</td>
<td>0.388 ± 0.314</td>
<td>HS</td>
<td>28.157 ± 3.128</td>
</tr>
<tr>
<td>T3 (nmol/L)</td>
<td>2.159 ± 0.869</td>
<td>5.164 ± 2.194</td>
<td>HS</td>
<td>0.727 ± 0.517</td>
</tr>
<tr>
<td>T4 (nmol/L)</td>
<td>114.118 ± 19.225</td>
<td>153.92 ± 22.926</td>
<td>HS</td>
<td>54.255 ± 9.195</td>
</tr>
<tr>
<td>Leptin (ng/mL)</td>
<td>10.382 ± 3.070</td>
<td>14.498 ± 2.734</td>
<td>HS</td>
<td>11.309 ± 2.703</td>
</tr>
</tbody>
</table>

S : Significant (P< 0.05). HS: Highly Significant (P< 0.001). NS: Non-Significant (P>0.05).

Table 2 Pearson correlation between AMH and the study parameters within each of the three studied groups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>G1</th>
<th>P-value</th>
<th>G2</th>
<th>P-value</th>
<th>G3</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.299</td>
<td>P&gt;0.27</td>
<td>-0.136</td>
<td>P&gt;0.515</td>
<td>-0.488</td>
<td>P&gt;0.185</td>
</tr>
<tr>
<td>BMI</td>
<td>0.0435</td>
<td>P&gt;0.181</td>
<td>0.175</td>
<td>P&gt;0.487</td>
<td>-0.469</td>
<td>P&gt;0.188</td>
</tr>
<tr>
<td>TSH</td>
<td>-0.304</td>
<td>P&gt;0.347</td>
<td>-0.255</td>
<td>P&gt;0.24</td>
<td>-0.027</td>
<td>P&gt;0.1</td>
</tr>
<tr>
<td>T3</td>
<td>-0.075</td>
<td>P&gt;0.794</td>
<td>-0.281</td>
<td>P&gt;0.169</td>
<td>-0.502</td>
<td>P&gt;0.121</td>
</tr>
<tr>
<td>T4</td>
<td>-0.271</td>
<td>P&gt;0.45</td>
<td>0.98</td>
<td>P&gt;0.592</td>
<td>-0.483</td>
<td>P&gt;0.165</td>
</tr>
<tr>
<td>Leptin</td>
<td>0.295</td>
<td>P&gt;0.4</td>
<td>-0.118</td>
<td>P&gt;0.114</td>
<td>0.173</td>
<td>P&gt;0.94</td>
</tr>
</tbody>
</table>
Figure 1 Comparing study variables between G1 and G2.

Figure 2 Comparing study variables between G1 and G3.

Figure 3 Correlation between serum levels of AMH and TSH, T3, and T4 within G1.

Figure 4 Correlation between serum levels of AMH and Age, BMI, and Leptin level within G1.

Figure 5 Correlation between serum levels of AMH and TSH, T3, and T4 level within G2.

Figure 6 Correlation between Age and BMI and serum levels of Leptin level within G2.

Figure 7 Correlation between serum levels of AMH and TSH, T3, and T4 level within G3.

Figure 8 Correlation between Age and BMI and serum levels of Leptin level within G3.
DISCUSSION

This investigation was aimed to provide additional data on PCOS and contribute to improve understanding of the process of how serum AMH changes with age, ratio of BMI, hormones of thyroid gland and leptin in PCOS. Such an effort would seem interesting as AMH has been suggested as a beneficial marker in the diagnosis of PCOS [14]. A large prospective study of youthful population showed that although AMH serum levels were increased in youthful with PCOS, the hormone was not verified to be a reliable predictor of PCOS [Reference]. In a recent study it was established that AMH production per granulosa cell was elevated by up to 75% in females with PCOS compared to controls [Reference]. Several studies had demonstrated elevated levels of AMH in adult women with PCOS [15]. The results of present study showed that serum levels of AMH were significantly higher in PCOS patients with autoimmune hyperthyroidism than in control group while the results showed that AMH was non-significantly higher in PCOS patients with hypothyroidism when compared with control group. This study was in agreement with study of Cristina et al. [16], who found that hypothyroidism/thyroid autoimmune disease was increased in women with PCOS. Also, it was in agreement with Kowalczyk et al. [17].

The adipocytokines (leptin and resistin) serve as causative or protective elements in the improvement of thyroid function disorders. Abnormal concentrations of adipocytokines (leptin and resistin) in hypothyroidism and hyperthyroidism have been reported with controversial results [18]. Thyroid dysfunction is also related with female infertility. Therefore, it has been proposed that women with hypothyroidism and ovulatory dysfunction infertility or have a desire to become pregnant, must be treated [19].

In present study, serum AMH levels were considerably correlated with leptin in both G2 and G3 groups as compared with G1. A correlation between thyroid hormone and leptin has been demonstrated in several studies. TSH stimulates leptin secretion by a direct influence on adipocytes, probably via TSH receptors on the surface of adipocytes [20]. PCOS is characterized by chronic unovulation and hyperandrogenemia. These features become evident with advancement of age and gradual increase of adipose tissue [21] which are often linked to leptin and its receptor [22]. Leptin seems to be directly related with obesity by preserving homeostasis of energy with reduced food intake and elevated energy spending [23]. In present study, relationship between leptin and BMI in females with PCOS was investigated. It was increased with BMI, but weak correlation with endocrine parameter [24]. Our results indicated that serum leptin was significantly high in PCOS with hyperthyroidism when compared with control group, however, it was significantly low in PCOS patients with hypothyroidism when compared with G1. This result was in agreement with Nasrin et al. [25], who showed elevated levels of serum leptin in patients with PCOS.

Moreover, a recent study found that serum leptin levels, among premenopausal females with hyperthyroidism, hypothyroidism or normal thyroid function, were similar before and after treatment of their abnormal thyroid status [21].

Furthermore, negative correlation was observed between serum AMH concentrations and leptin levels in hyperthyroidism group while positive correlation between serum AMH and leptin levels in hypothyroidism group.

In conclusion, PCOS women of fertile age have higher AMH, TSH, T3, T4 and leptin levels, regardless of their thyroid gland function, as compared with healthy control subjects. AMH can be considered as an important marker for the diagnosis of PCOS.

Ethical Clearance: Obtained from the Research Ethics Committee at College of Dentistry/University of Misan, Iraq.

Source of Funding: Self-funded.

Conflict of Interest: Nil.

REFERENCES


8- Abd El-Hafez HA, Elrakhawy MM, Abd El-Aziz S, El-Eshmawy MM. Thyroid function and volume are associated with anthropometric measurements and insulin resistance in Egyptian women with polycystic ovary syndrome. J Diabetes Metab 2013; 4: 1-5.


HLA-G and P-Selectin Gene Polymorphism in Women with Recurrent Abortion Having Antiphospholipid Syndrome

Shahad Fadhil Hashim1, Israa Adnan Ibraheam1, Oruba Qutuff AL-Bermani1

1Collage of Sciences for women/ University of Babylon, Iraq

ABSTRACT

Background: Antiphospholipid syndrome (APS) is one of the autoimmune disorders in which the vascular thrombosis can cause recurrent pregnancy losses in the first trimester of pregnancy. The aim of this study was to investigate the association of HLA-G 14-bp insertion/deletion and P-selectin N562D gene polymorphism with the thrombosis in pregnant women with APS.

Method: In this study we recruited 40 pregnant females diagnosed with APS. Blood samples were obtained from all patients and their controls during the period from 1st, September 2017 to 1st, April 2018. DNA was extracted from all samples and HLA-G 14-bp insertion/deletion and P-selectin N562D gene polymorphism were detected using PCR technology.

Results: HLA-G insertion/deletion gene polymorphism results revealed that the genotype insertion/insertion (II) formed about 17% from patients samples while in control it formed 12%. The genotype insertion/deletion (ID) genotype formed 60% from patients while in the controls it formed 55%. The genotype deletion/deletion (DD) formed 22.5% while in controls it formed 32.5%. In the case of the P-selectin N562D formed DD 42.5%, DN 37.5% and NN 20% in patients while in control it formed 55%, 22.5% and 22.5%, respectively.

Conclusion: The HLA-G 14-bp insertion/deletion and P-selectin N562D genes polymorphism were not associated with recurrent abortion in Iraqi women with antiphospholipid syndrome.

Keywords: Antiphospholipid syndrome, polymorphism, miscarriage, HLA-G gene, P-selectin, PCR.

INTRODUCTION

Antiphospholipid syndrome (APS), also called Hughes syndrome, is an autoimmune syndrome that involves formation of autoantibodies against cell membrane phospholipids that leads to formation of blood clots, or thrombosis, in the arteries and veins, so the complication of pregnancy starts to appear such as miscarriage, stillbirth or severe preeclampsia [1]. Antiphospholipid antibodies have a heterogeneous group of autoantibodies such as lupus anticoagulant (LAC) and anticardiolipin (ACL) which have negatively charged phospholipids [2]. The antiphospholipid has some characters such as causing arterial and venous thrombosis leading to abortions, and causing pregnancy complications such as placental insufficiency, fetal growth restriction and preeclampsia [3]. The relation of the presence of APS and the HLA gene has been reported. Previous studies reported some molecules that were encoded by HLA-DM and located between HLA-DQ and DP subregions of human histocompatibility [4]. The functional molecule, human leukocyte antigen G (HLA-G) belongs to the class Iib. The HLA-G is characterized by a non-covalent link between the b2-microglobulin and the heavy chain of glycoprotein [5]. The HLA-G gene is one of main determinants of allograft rejection that were studied in the status of immune tolerance in pregnancy [6]. The site of HLA-G gene is on the short arm of chromosome 6 within the region (6p21.2-21.3). Also, it has seven isoforms that were generated by the alternative splicing of the primary HLA-G. Three of these isoforms are (HLA-G5,-G6 and -G7) that are found during pregnancy [7]. The HLA-G gene has an important role in pregnancy, the expression of this gene occurs on the trophoblastic cells in the
placenta and interacts with the inhibitory receptors on
the natural killer cells (NK) and T lymphocyte cells
[8]. The selectin family includes L-selectin, E-selectin
and P-selectin. The latter is stored in the unstimulated
platelets in the alpha granules [9]. The P-selectin is a
soluble form in the plasma and mediates the attachment
and rolling of the leukocyte on the endothelial cells that
needed in leukocyte thrombosis [10]. Some researchers
supposed that the P-selectin soluble levels are increased
in the APS that have a thrombosis [11]. The aim of this
study was to investigate the association  of HLA-G
14-bp insertion/deletion and P-selectin N562D gene
polymorphism with the thrombosis in pregnant women
with APS.

MATERIALS AND METHOD

Subjects: In this study we obtained 40 samples
of blood from pregnant women diagnosed with
antiphospholipid syndrome attended AL0Zahraa
Hospital at Babylon City, Iraq. The study extended
from 1st, September 2017 to 1st, April 2018. Controls
were healthy women who do not have any recurrent
miscarriages.

Genomic DNA extraction and polymorphism
detection:

DNA samples were extracted by a special extraction
kit according to the manufacturing protocol of the
company (favrogen kit/Taiwan) and stored at -20°C,
the extraction conditions were similar to [12]. HLA-G
primer, used in this study, sequence was shown in Table
1. The PCR reaction volume was 25μL and contained
12.5μL from master mix (promega/USA), 1 μL from
both forward and reverse, 5μL of DNA sample and
5.5μL of distilled water. The PCR system was carried
out by a thermo cycler (Applied Biosystems, USA).
The PCR program was for 35 cycle, 94°C for 5min as
initial denaturation, 94°C for 30sec, 64°C for 1min,
72°C for 45sec and 72 for 10min as a final extension and
the fragment size (210/224 bp), then the products were
loaded to the agarose gel 3% contained 5% of red safe
dye and visualized by the ultra violet light by using gel
documentation system (ATTA-E graph / Japan).

<table>
<thead>
<tr>
<th>Table 1 Sequences of primers used in the study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primer name</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>HLA-GF</td>
</tr>
<tr>
<td>HLA-GR</td>
</tr>
<tr>
<td>D-R 562</td>
</tr>
<tr>
<td>N-R 562</td>
</tr>
<tr>
<td>Com- mon</td>
</tr>
</tbody>
</table>

RESULTS AND DISCUSSION

The results showed that the ID genotype was forming
a large percentage from the other alleles, it is forming
about 24(60%) in our patients samples while in the
controls is was forming 22(55%) despite the convergent
percentages of the ID genotype in the patients and
controls. It had an association with the APS patients,
yet its effect did not appear here. It might be because we
need to increase the sample size of APS patients. The ID,
the II and the DD genotypes were 24(60%), 7(17.5%),
9(22.5%), respectively, while in the controls they formed
5(12.5%), 22(55%) and 13(32.5%), respectively (Table
2 & Figure 1). According to the convergent percentages
between patients and controls, there was no significant
difference. The DD genotype formed 13(32.5%) in
controls and 9(22.5%) in patients.
Figure 1 Screening of the DNA samples for the HLA-G 14-pb insertion/deletion gene polymorphism in 3% agarose with 5% red safe dye and 100 bp ladder.

Table 2 Percentages and P value of HLA-G insertion/deletion gene polymorphism

<table>
<thead>
<tr>
<th>Genotype HLA-G</th>
<th>Patients No.(%)</th>
<th>Controls No.(%)</th>
<th>*P-Value</th>
<th>Chi- squared</th>
<th>OR (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>II*</td>
<td>7(17.5%)</td>
<td>5(12.5%)</td>
<td>0.48</td>
<td>0.14</td>
<td>1.28 (0.35-4.64)</td>
</tr>
<tr>
<td>ID</td>
<td>24(60%)</td>
<td>22(55%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DD</td>
<td>9(22.5%)</td>
<td>13(32.5%)</td>
<td>0.27</td>
<td>0.94</td>
<td>2.02 (0.48-8.43)</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alleles</th>
<th>Patients</th>
<th>Controls</th>
<th>*P-Value</th>
<th>Chi- squared</th>
<th>OR (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>38</td>
<td>32</td>
<td>0.07</td>
<td>2.49</td>
<td>1.64 (0.88-3.03)</td>
</tr>
<tr>
<td>D</td>
<td>42</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P ≤ 0.05. OR= (95% CI). * reference.

The heterogeneous insertion/deletion samples were forming large percentages than other samples. In a previous study [14] on the HLA-G levels in recurrent spontaneous abortions (RSA) in Iran found that both HLA-G del/del and ins/ins gene polymorphism were reduced in patients with recurrent spontaneous abortion while HLA-G ins/del is increased in patients with RSA. Another study in Tabriz, Iran, found an association between heterozygous HLA-G *0105 N null allele and recurrent miscarriage and found that it was due to its effect on decreasing the level of HLA-G expression in placenta [15]. In Saudi Arabian women the genotype ins/ins was slightly increased in women with RSA [13].

There is no previous study to detect the association of HLA-G gene polymorphism and abortion in women with antiphospholipid syndrome or this polymorphism role in antiphospholipid syndrome, but de Carvalho et al. [17] found that treating patients with primary antiphospholipid syndrome by heparin led to increasing the levels of HLA-G antigens [16], also HLA-G antigen plays an important role in pregnancy tolerance [17]. This proof came from the fact that placental cells increase expression of both membrane-attached and soluble HLA-G isotypes which react with inhibitory receptors on leukocytes leading to modulation of the immune response by inhibiting the proliferation of CD4+ T cells, induction of CD4+ T cell energy and differentiation of CD4+ T cells into suppressive cells [18].
The results of P-selectin N562D gene polymorphism (Table 3 & Figure 2) showed that the DN genotype formed 15(37.5%) from the APS patients, while in controls it formed 9(22.5%).

![Image](image-url)

**Figure 2** The screening of P-selectin N562D gene polymorphism in 1.5% agarose with 5% red safe dye and 100 bp ladder.

**Table 3 Percentages and P value of P-selectin N562D gene polymorphism**

<table>
<thead>
<tr>
<th>Genotype N562D</th>
<th>Patients No.(%)</th>
<th>Control No. (%)</th>
<th>*P-Value</th>
<th>Chi-squared</th>
<th>OR (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD*</td>
<td>17(42.5%)</td>
<td>22(55%)</td>
<td>0.19</td>
<td>2.12</td>
<td>0.46 (0.16-1.31)</td>
</tr>
<tr>
<td>DN</td>
<td>15(37.5%)</td>
<td>9(22.5%)</td>
<td>0.51</td>
<td>0.085</td>
<td>0.86(0.27-2.72)</td>
</tr>
<tr>
<td>NN</td>
<td>8(20%)</td>
<td>9(22.5%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Alleles | | |
|---------| | |
| D       | 49 | 53 | 0.31 | 0.43 | 0.80(0.42-1.53) |
| N       | 31 | 27 |          |             |          |

P≤0.05. OR= (95% CI). *reference

Alpay et al. [10] focused on the association between N562d polymorphism and thrombosis in patients with antiphospholipid and found that the genotype DN is higher in patients with antiphospholipid compared with healthy subjects. In addition, DN genotype was significantly frequent in patients with antiphospholipid with thrombosis compared with patients with APS without thrombosis. A previous study [10] suggested that APS patients develop high expression level of soluble P-selectin (S-P-Selectin) [11] which mediate adhesion and placement of leukocytes on the endothelial cell of the blood vessels leading to increase recruitment of more leukocytes to focal coagulation [9,20].

**Ethical Clearance:** Obtained from the Research Ethics Committee at Babylon Health Directorate, Babylon City, Iraq.

**Source of Funding:** Self-funded.
Conflict of Interest: Nil

REFERENCES


Oral Hygiene and Periodontal Treatment in Children with Coeliac Disease: A Case-Control Study

Wissam Hamid Al-Janabi¹, Mukhlaed Luay Al-Fallouji², Ali Falah Hassan²

¹Lecturer/ College of Dentistry/ Babylon University/ Babylon Province/ Iraq,
²Assistant Lecturer College of Dentistry/ Babylon University/ Babylon Province/ Iraq

ABSTRACT

Background: Coeliac disease (CD) is a T-cell-intervened provocative enteropathy described by villous atrophy and tomb hyperplasia coming about because of duodenal aggravation. A number of studies raised the issue of poor dentation and more prevalence of dental problems in children with celiac disease, however sufficient controversy existed that permitted the conduction of the current study.

Aim of the study: this study was designed aiming at identifying possible differences between apparently healthy individuals and patients with coeliac disease regarding the periodontal treatment need index.

Patients and method: This case-control study included 54 children and adolescents with celiac disease and 61 age- and gender-matched apparently healthy individual as controls. A questionnaire form included information about age, gender, residency, duration of celiac disease and oral hygiene habits; whereas examination included assessment of periodontal treatment need index for both groups. The study was carried out at dental clinic in College of Dentistry, Ibn-Hayain University, Karbala province, Iraq, during the period from July 2017 to June 2018.

Results: children who needed intervention, reinforcement of oral hygiene, reinforcement of oral hygiene and scaling and complex treatment accounted for 10, 22, 17 and 5, respectively, in study group versus 22, 17, 18 and 4, respectively, in control group and the rate of children who needed no intervention was significantly lower in study group than in control group, 10 versus 22, respectively (P< 0.05).

Conclusion: All celiac patients need to be incorporated into a preventive dental program that provides proficient oral cleanliness, inspiration training for home oral cleanliness, pits and crevices fixing, topical fluoride application. Close to this, remedial activities ought to be performed in nearness of caries or breaks of hypoplastic finish, using immediate or aberrant traditionalist reclamations.

Key words: Dental hygiene, celiac disease, oral health, oral program, gluten-free diet.

INTRODUCTION

Celiac illness (CD) is a T-cell-intervened provocative enteropathy described by villous decay and tomb hyperplasia coming about because of duodenal aggravation. The natural trigger of CD is ingested gluten, a heterogeneous blend of glutamine and proline-rich proteins from wheat, rye and grain. Untreated CD is described via autoantibodies to tissue transglutaminase (TG2), an intestinal compound that ties and changes gluten peptides, bringing about their enhanced authoritative to HLA-DQ2 or HLA-DQ8, the major hereditary inclination for CD, trailed by enactment and development of dangerous Th1 T cells in the gut. Apart from the built up parts of gluten, HLA-DQ2/HLA-DQ8, TG2, ecological factors such as viral and microbial diseases, and maybe encouraging practices have likewise been proposed to add to CD pathogenesis. As to ecological components, much consideration has been coordinated at the endogenous microbiome as well as contaminations that may encourage in the loss of resilience to gluten. Gut microbial structures vary in patients with CD contrasted with healthy subjects. For instance, expanded levels of conceivably unsafe...
Bacteroides and destructive Escherichia coli and diminished levels of commensal bifidobacteria have reliably been found in the duodenum and excrement of CD patients, paying little respect to illness movement [6-10]. In another examination, expanded extents of enterobacteria and staphylococci were accounted for in CD quiet fecal examples and duodenal biopsy examples, and gluten abstain from food (Gluten-Free Diet; GFD) reestablished these extents to the levels of general population [7]. Be that as it may, it stays to be appeared if these microbial changes drive ailment action or are just an outcome of the ingested gluten-containing sustenance and intestinal fiery action. Moreover, almost no one thought about the robotic parts of the progress from CD to recalcitrant CD (RCD), a condition where sickness holds on regardless of the strict avoidance of gluten, and changes in the oral-gastrointestinal (GI) microbiome that may add to the diligent incendiary status in RCD.

Therefore, this study was designed aiming at identifying possible differences between apparently healthy individuals and patients with celiac disease regarding the periodontal treatment need index.

**PATIENTS AND METHOD**

This case control study included 54 children and adolescent patients with celiac disease and 61 age- and gender-matched apparently healthy individual. A questionnaire form included information about age, gender, residency, duration of celiac disease and oral hygiene habit; whereas examination included assessment of periodontal treatment need index for both groups. The study was carried out in the dental clinic at College of Dentistry, Ibn-Hayain University, Karbala province, Iraq, during the period from July 2017 to June 2018. Sample size was estimated according to the overall estimated prevalence of CD in Iraq and nearby countries with confidence interval of 95% and power of 0.8 and an error margin of 0.05. The study was approved by the ethical approval committee at the College of Dentistry following a written consent that was signed by parents and or persons taking care of subjects enrolled in the present study.

In order to evaluate CPITN, WHO-type probes were used. The evaluation points on probing were medial, midline and distal, both in buccal and palatine/lingual surfaces in each tooth. Values from 0 to 4 were given as stipulated by the WHO. The mouth was divided into sextants and the largest value determined the child’s periodontal status. Thus, the need for periodontal treatment was (TN): TN 0 in case of gingival health, TN 1 needs to improve oral hygiene (code 1 in the CPITN), TN 2 needs of scaling, elimination of overhanging restorations and improving oral hygiene (codes 2 and 3) and TN 3 in case of complex treatment (code 4) [11].

Data were analyzed using SPSS version 23 and Microsoft Office 2010. Quantitative variables were expressed as mean, range, median and inter-quartile range; whereas categorical variables were expressed as numbers and percentages. Chi-squared test was used to study association between categorical variables while independent samples $t$-test was used to study differences in mean between two groups in case of normally distributed variables and Mann Whitney U test in case of non-normally distributed numeric variables. The level of significance was set at $P \leq 0.05$.

**RESULTS**

Current study included 54 children with celiac disease and 61 healthy age- and gender-matched children serving as controls. Demographic characteristic of the control and study groups were shown in Table 1. There was no significant difference between the two groups in age, gender and residency. Mean±SD duration of celiac disease in study group was 6.91±3.29 years and it ranged from 2 to 9 years. Assessment of oral hygiene habits revealed no significant difference ($P> 0.05$) in the following characteristics: using tooth brush, received health education of oral hygiene, regular tooth brushing after meals and frequency of visit to the Dentist Service and reason for the last visit to the dentist (Table 2).

Table 3 showed that the number of children with healthy, bleeding, calculus and pockets were 10, 20, 19, 5 and 0, respectively, in study group and 22, 19, 16, 4 and 0, respectively, in the control groups. The difference in rate of children with healthy status was significantly lower in study group than in control group, 10 versus 22, respectively ($P< 0.05$). Table 4 showed that children who needed no intervention, reinforcement of oral hygiene, reinforcement of oral hygiene and scaling and complex treatment accounted for 10, 22, 17 and 5, respectively, in study group versus 22, 17, 18 and 4, respectively, in control group. Moreover, the rate of children who needed no intervention was significantly lower in study group than in control group, 10 versus 22,
respectively (P< 0.05).

Table 1: Demographic characteristics of control and study groups

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Study group</th>
<th>Control group</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 54</td>
<td>n = 61</td>
<td></td>
</tr>
<tr>
<td>Age/year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean±SD</td>
<td>8.23±5.19</td>
<td>9.01±4.21</td>
<td>&gt; 0.05*</td>
</tr>
<tr>
<td>Range</td>
<td>5-16</td>
<td>5-15</td>
<td></td>
</tr>
<tr>
<td>Gender/No.(%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>30 (55.6%)</td>
<td>27 (44.3%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>24 (44.4%)</td>
<td>34 (55.7%)</td>
<td></td>
</tr>
<tr>
<td>Residency/No.(%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>43 (79.6%)</td>
<td>41 (67.2%)</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>11 (20.4%)</td>
<td>20 (32.8%)</td>
<td></td>
</tr>
<tr>
<td>Duration of disease/year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean±SD</td>
<td>6.91±3.29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>2-9</td>
<td></td>
<td>------</td>
</tr>
</tbody>
</table>

n: number of cases. * Independent samples t-test. † Chi-squared test. NS: not significant.

Table 2 Information about oral hygiene in control and study groups

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Study group</th>
<th>Control group</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 54</td>
<td>n = 61</td>
<td></td>
</tr>
<tr>
<td>Use of toothbrush</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>44 (81.5%)</td>
<td>47 (77.0%)</td>
<td>&gt; 0.05†</td>
</tr>
<tr>
<td>no</td>
<td>10 (18.5%)</td>
<td>14 (23.0%)</td>
<td>NS</td>
</tr>
<tr>
<td>Received health education of oral hygiene</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>10 (18.5%)</td>
<td>12 (19.7%)</td>
<td>&gt; 0.05†</td>
</tr>
<tr>
<td>no</td>
<td>44 (81.5%)</td>
<td>49 (80.3%)</td>
<td>NS</td>
</tr>
<tr>
<td>Regular tooth brushing after meals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>23 (42.6%)</td>
<td>31 (50.8%)</td>
<td>&gt; 0.05†</td>
</tr>
<tr>
<td>no</td>
<td>31 (57.4%)</td>
<td>30 (49.2%)</td>
<td>NS</td>
</tr>
<tr>
<td>Frequency of visit to the Dentist Service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>once every 6 months</td>
<td>2 (3.7%)</td>
<td>1 (1.6%)</td>
<td>&gt; 0.05†</td>
</tr>
<tr>
<td>once every year</td>
<td>17 (31.5%)</td>
<td>27 (44.3%)</td>
<td>NS</td>
</tr>
<tr>
<td>once more than one year</td>
<td>35 (64.8%)</td>
<td>33 (54.1%)</td>
<td></td>
</tr>
<tr>
<td>Reason for the last visit to the dentist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toothache</td>
<td>28 (51.9%)</td>
<td>33 (54.1%)</td>
<td>&gt; 0.05†</td>
</tr>
<tr>
<td>Dental extraction</td>
<td>15 (27.8%)</td>
<td>18 (29.5%)</td>
<td>NS</td>
</tr>
<tr>
<td>Routine examination</td>
<td>11 (20.4%)</td>
<td>10 (16.4%)</td>
<td></td>
</tr>
</tbody>
</table>

n: number of cases. † Chi-squared test. NS: not significant
Table 3 Number of children according to periodontal status

<table>
<thead>
<tr>
<th>Periodontal status</th>
<th>Study group (n = 54)</th>
<th>Control group (n = 61)</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>Condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.0</td>
<td>Healthy</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>1.0</td>
<td>Bleeding</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>2.0</td>
<td>Callus</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>3.0</td>
<td>Pocket 4-5 mm</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>4.0</td>
<td>Pocket 6+ mm</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

\(n\): number of cases. †: Chi-square test (healthy versus not healthy). S: significant

Table 4 Numbers of children in relation to need for periodontal treatment

<table>
<thead>
<tr>
<th>Need for treatment</th>
<th>Study group (n = 54)</th>
<th>Control group (n = 61)</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>Condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>Healthy</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>1</td>
<td>Reinforcement of oral hygiene</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>Reinforcement of oral hygiene and scaling</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>Complex treatment</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

\(n\): number of cases. †: Chi-square test (healthy versus not healthy). S: significant

DISCUSSION

In the present study, although there was no significant difference in demographic characteristics and in the oral hygiene habits between children with celiac disease and apparently healthy control group, the state of oral up on examination and according to the index of periodontal treatment need was significantly “bad” in study group compared to that of control group. This finding suggests that children with celiac are more prone to dental and oral problems than their healthy counterparts. Similar findings have been reported in celiac children by a number of authors [12-14].

Oral issues have been related with CD and other invulnerable intervened sicknesses such as Crohn’s infection [15,16]. In addition, stress, tension and rest unsettling influences can likewise work as extra triggers [17]. In considers led on kids as well as grown-ups, CD and both veneer hypoplasia and RAS have been unmistakably related. Lacquer hypoplasia in the perpetual dentition is generally respective, symmetrical, all the more as often as possible found on the focal incisors, upper parallel and lower ones, the cusps of the primary molars and canines and pre-molars. To-date, the pathogenesis of polish deformities in CD does not have an unmistakable clarification. The more certify theory is that the harm is the impact of poor mineralization caused by malabsorption of calcium, phosphate and vitamin D [18-20]. The low convergence of calcium caused by intestinal malabsorption and seen in patients amid tooth improvement is for sure engaged with the advancement of finish hypoplasia [20,21]. In any case, extraordinary invulnerable or hereditary beginning of injuries can’t be barred. T-lymphocytes may have a part in assaulting the finish [22,23]and there might be a relationship between dental veneer impacts and the haplotype HLA-DR3 even in the all inclusive community. Unexpectedly, the DR5-DR7 phenotype has been related with assurance...
from harm to the lacquer, clarifying why not all CD patients experience the ill effects of polish hypoplasia [22]. Other fundamental components (e.g. lack of healthy sustenance and decreased grouping of vitamin D and A) are potentially engaged with finish hypoplasia in CD and different maladies causing ailing health. The pervasiveness of dental veneer hypoplasia deserts fluctuates among the investigations. Aguirre et al. [24] noticed that finish surrenders were seen in 72 (52.5%) patients with CD and 22 (42.3%) control subjects (P = 0.006); they generally influenced the incisors (70.8%) and canines (20.8%) at the level of a lasting incisal third of the crown.

We believe that these structural changes are responsible for the bad oral health status of celiac disease patients. Thus, all celiac patients ought to be incorporated into a preventive dental program that gives proficient oral cleanliness, inspiration training for home oral cleanliness, pits and crevices fixing and topical fluoride application. Close to this, remedial activities ought to be performed in nearness of caries or breaks of hypoplasic finish, using immediate or aberrant traditionalist reclamations.

**Ethical Clearance:** Obtained from the Research Ethics Committee at College of Dentistry, Ibn-Hayain University, Karbala province, Iraq.

**Source of Funding:** Self-funded.

**Conflict of Interest:** Nil.

**REFERENCES**


Immunoassay Study for Detection of Hepatitis C Virus among Blood Donors in Diwaniyah Governorate, Iraq

Abdulameer K. Leelo
Nursing College/ Alqadisiyah University, Iraq

ABSTRACT

Background: Hepatitis C virus can cause acute or chronic infection. Spread of HCV happens through communication of normal persons with HCV-infected blood components, body fluids or whole blood. The aim of current study was to identify the antibody against Hepatitis C Virus (HCV) by enzyme immunoassay in the blood donors (BD) in the Blood Transfusion Center (BTC) and the Central Public Health Laboratory in Diwaniyah Governorate. Methods: This study was carried out from January 2015 till December 2016. It included immunoassay for 26318 blood donors during 2015 and 27657 blood donors during 2016. Results: We detected that the incidence of HCV infection among blood donors in Diwaniyah during 2015 was 0.057%. Of the latter, 73.33% were from urban areas whereas 26.67% of them were from rural areas. During 2016, 0.203% of blood donors were seropositive for HCV. Of the latter, 71.4% lived in urban areas and 28.6% lived in rural areas. Conclusion: Reviewing the risk factors related to HCV in Iraq would provide good evidence(s) for persons who are responsible for infection control and health planning to reduce the spread of HCV infection.

Keywords: Hepatitis C Virus; blood donors, Diwaniyah Governorate, Seropositive.

INTRODUCTION

Hepatitis C virus (HCV) can cause acute or chronic infection. It is usually asymptomatic infection and, without any management, around 15–45% of infected people naturally clear the virus within six months of infection while 60–80% of those infected individuals will advance into chronic HCV infection. Those individuals who have chronic HCV infection, 15–30% of them, will develop liver cirrhosis within 20 years.[1] Spread of HCV happens through communication of normal persons with HCV-infected blood components, body fluids or whole blood.[2] World Health Organization[3] approved that all blood donors should be investigated for HCV antibodies (screening for either antigen or antibody). During screening immunoassay test, an important number of blood donors are excluded from blood donation, because of they are seropositive for HCV.[4] The value and security for transfusion of blood is of continuing worry all over the world, mainly in unindustrialized countries where 80% of world populace lives[5]. In many countries including Iraq, all blood units should be screened by enzyme-linked immunosorbent assay (ELISA) in blood banks for HCV[6].

MATERIAL AND METHOD

This study was conducted in the Blood Transfusion Center (BTC) and the Central Public Health Laboratory in Diwaniyah Governorate (Diwaniyah governorate in middle Euphrates region of Iraq, lies 180 km south of Baghdad). The study was carried out from January 2015 till December 2016 to identify the antibody against Hepatitis C Virus (HCV) by enzyme immunoassay in the blood donors (BD) of the Transfusion Center (BTC). This study involved immunoassay for 26318 blood donors (113 females & 26205 males) during 2015 also studied 27657 of the blood donors during 2016 (27581 males & 76 females). The present study was ethically approved by the Research Ethics Committee at Al Qadisiyah Nursing College.

The full history and medical examination were done for all donors coming to the (BTC) and they must meet the general criteria for blood donation that were acknowledged by WHO while donors who did not meet...
these standards (such as those with medical history of symptoms suggestive of Acquired Immune Deficiency syndrome, history of jaundice and history of close contact with a patient suffering from hepatitis in the last 6 months) were excluded from blood donation and from this study, too.[7]

About 5 ml of blood for testing was reserved at time of blood donation from the primary bag in aseptic method, with the usage of disposable single-use syringe, and was transported to a sterile plain test tube. Then, after blood clot, separation of the serum by centrifugation at 3000 rpm and testing with fourth -generation ELISA kits (Enzyme Linked Immunosorbent Assay) were used for detecting anti-HCV antibody in the BD serum. The residual serum was kept in vials at -20°C until use if needed. For the qualitative detection of seropositive blood donor (antibodies to HCV) serum and the test procedure was done according to the maker guidelines (CAT.No.ITP23003). Hepatitis C Virus negative and positive serum controls were used with the anti-HCV immunoassay procedures.

All positive anti-HCV samples by ELISA were tested again by the same procedure of ELISA kits (duplication of the test to exclude contamination or false positivity). Only samples which were repeatedly reactive for ELISA were regarded as positive. Blood donors were grouped according to their age in years into: Group 1 (10-30), Group 2 (31-50) and Group 3 (51-70)

**RESULTS**

The study was carried out to observe (using ELISA) the antibody for Hepatitis C Virus (HCV) in donors at the Blood Transfusion Center (BTC), Diwaniyah governorate, Iraq. This study included immunoassay for 26318 blood donors (113 females & 26205 males) during 2015 and also studied 27657 of the blood donors during 2016 (27581 males & 76 females). (Table 1).

**Table 1** Total numbers of blood donors in Diwaniyah Blood Bank during 2015 & 2016 who undergone immunoassay for detection of HCV infection

<table>
<thead>
<tr>
<th>Year Of Immunoassay</th>
<th>Total Blood Donors</th>
<th>Females</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>26318</td>
<td>113</td>
<td>26205</td>
</tr>
<tr>
<td>2016</td>
<td>27657</td>
<td>76</td>
<td>27581</td>
</tr>
</tbody>
</table>

We detected that in Diwaniyah blood donors (BD) the number of HCV infection cases during 2015 were 15 (0.057%), eleven of them (73.33%) were from urban area whereas four of them (26.67%) were from rural areas. On the other hand, during 2016, we found that 56 (0.203%) of seropositive BD had HCV. Of the latter, 40 (71.4%) of them were living in urban areas whereas 16 (28.6%) patients were living in rural areas (Tables 2 & 3).

**Table 2**: Numbers and percentages of infected blood donors with HCV during years 2015 & 2016 Year of Immunoassay

<table>
<thead>
<tr>
<th>Year of Immunoassay</th>
<th>Total Blood Donors</th>
<th>No. of HCV-Seropositive Males (%)</th>
<th>No. of HCV-Seropositive Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>26318</td>
<td>15 (0.057)</td>
<td>zero</td>
</tr>
<tr>
<td>2016</td>
<td>27657</td>
<td>56 (0.203)</td>
<td>zero</td>
</tr>
</tbody>
</table>
Table 3 Distribution of infected BD with HCV according to the residency areas

<table>
<thead>
<tr>
<th>Year of Immunoassay 2015</th>
<th>Year of Immunoassay 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>HCV</td>
<td>HCV</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>26.67%</td>
<td>73.33%</td>
</tr>
</tbody>
</table>

According to the age group, the study detected that during 2015 8 BD (53.33%) of seropositive BD were in the age range 31-50 years while 5 BD (33.33%) of them were within the age group 10-30 years. In addition, 2 BD (13.33%) of the HCV positive were in the age range 51-70 years (Table 4).

On the other hand, the study detected that during 2016 48 (85.71%) of seropositive BD were in the age range 31-50 years while 4 BD (7.14%) of them were within age group 10-30 years and 4 BD (7.14%) of them were within the age range 51-70 years (Table 4).

Table 4 Distribution of seropositive HCV blood donors according to age group

<table>
<thead>
<tr>
<th>Year of Immunoassay</th>
<th>Age group 10-30 years</th>
<th>Age group 31-50 years</th>
<th>Age group 51-70 years</th>
<th>Total HCV Seropositive BD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>33.33% (5 BD)</td>
<td>53.33% (8 BD)</td>
<td>13.33% (2 BD)</td>
<td>15 BD</td>
</tr>
<tr>
<td>2016</td>
<td>7.14% (4 BD)</td>
<td>85.71% (48 BD)</td>
<td>7.15% (4 BD)</td>
<td>56 BD</td>
</tr>
</tbody>
</table>

DISCUSSION

The rules of the WHO endorse the use of a single quality-assured serological test (i.e. either a laboratory-based immunoassay [enzyme immunoassay or chemiluminiscence immunoassay] or rapid diagnostic test (RDT) to detect HCV [8]. World Health Organization [3] approved that all blood donors should be investigated for HCV antibodies (screening either for antigen or antibody) [9].

Current study reported that 15 of the BD through 2015 had hepatitis C viral infection represented 0.057% of the males BD while we find that during 2016 there are 56 blood donors seropositive for HCV (0.203%) with average 0.13% for the two years of study (Table 2).

Based on our outcomes, there was an increase in HCV seropositivity in the BD population that has been observed within the last year (2016). However, the percentage of HCV seropositivity results detected (0.13%) in this result were significantly lower than that reported by other Iraqi researcher like Al-Doori in 2006 [10] who detected 0.45% of the BD in Al-Anbar Governorate. In addition, 0.386% of the BD were detected by Obaid 2011 [11] in Al-Muthanna Governorate while Tawfeeq et al. [12] reported that the occurrence of seropositive-Hepatitis C virus antibody among blood donors was 0.29% in Babylon Governorate. Moreover, in 2017 Hussein et al. [13] reported that the prevalence of Hepatitis C Viruses among Blood Donors was 0.2% in Duhok (Kurdistan Region). Furthermore, Ataallah et al. [14] reported that 0.3% of blood donors were positive for hepatitis C in Baghdad City.

The occurrence of seropositive HCV- antibody BD differs from one nation to another. When we compare our result with those from other regional countries, Boustani et al. [15] found that of 72,527 blood donors in Ilam city (Iran) only 27 of them were infected with HCV. This figure was lower than that reported in current study. This may be due to good application of the WHO instructions in Ilam city.
et al.\textsuperscript{[16]} reported that the frequency of HCV-positive antibody blood donor cases was 0.5% in Iran which was more higher than our results.

In Saudi Arabia, Abdullah\textsuperscript{[17]} found that the incidence of seropositive HCV in BD was 0.4% similar to that (5.5%) reported among Egyptian blood donors\textsuperscript{[18]}. These figures were higher than that reported in current study.

Current study also detected that during 2015 8 BD (53.33%) of the BD who were seropositive for HCV were in the age range 31-50 years while 33.33% (5 BD) of them were with age group 10-30 years and 13.33% (2 BD) of the HCV positive were in the age range 51-70 years. On the other hand, during 2016 the BD who were seropositive for HCV when distributed according to the age group we found that 85.71% of them (48 BD) were in the age range 31-50 years while 7.14% (4 BD) of them were within the age group 10-30 years and 7.14% (4 BD) of the HCV positive were in the age range 51-70 years (Table 4). These findings indicated that the infected blood donor were mainly in the third and fourth decades of age which may be clarified by the increased exposure met with age. These data were consistent with those reported in the United States\textsuperscript{[19]} where 65% of individuals with HCV infection were aged 30-49 years.

Moreover, during 2015, 15 (0.057%) of BD had hepatitis C viral infection; eleven of them (73.33%) were from urban areas whereas four of them (26.67%) were from rural areas. During year 2016, 56 (0.203%) of the seropositive BD had HCV. Of the latter, 40 (71.4%) of them lived in urban areas and 16 (28. lived in rural areas (Tables 2 & 3). These data were similar to those reported by\textsuperscript{[20]} who reported higher incidence of HCV in urban than in rural areas. These findings could be due to community-based variation.

**CONCLUSION**

Reviewing the risk factors related to HCV in Iraq would provide good evidence(s) for persons who are responsible for infection control and health planning to reduce the spread of HCV infection.

**Ethical Clearance:** Obtained from the Research Ethics Committee at College of Nursing/University of AL-Qadisiyah, Iraq.

**Source of Funding:** Self-funded.

**Conflict of Interest:** Nil.

**REFERENCES**


AIMuthanna University, Iraq: 2014.
The Effect of Hypercytokinemia in the Pathogenesis of Polycystic Ovary Syndrome in Iraqi Women

Safa Sailh Mahdu Al-Shattawi, Essam Fadel Al-Jumili

Biotechnology Dept. Genetic Engineering and Biotechnology Institute for Postgraduate Studies, University of Baghdad. Baghdad/ Iraq

ABSTRACT

Polycystic Ovary Syndrome (PCOS) exists commonly among women in the reproductive age with an incidence rate of 3-15%. The clinical manifestations of PCOS include oligomenorrhea, infertility and obesity. There is significant overlap of symptoms between PCOS and hypercytokinemia. The aim of this study was to investigate the prevalence of hypercytokinemia in PCOS patients. Materials and Method: This was a cross-sectional study of clinically diagnosed 50 females with PCOS and another 50 age-matched females were studied as the control population. PCOS and Hypothyroidism were diagnosed by Ultrasound (US) and biochemical parameters IL6, TSH, T3 and T4. Results: The mean IL6, TSH, T3 and T4 were significantly higher in women with PCOS as compared to healthy women controls. Conclusion: PCOS is on the rise in hypothyroid patients. Identification of hypothyroidism may help us to treat and prevent fertility complications in PCOS females. Hypothyroidism needs to be early corrected in the management of infertility associated with PCOS which is of major concern these days.

Keywords: Polycystic Ovarian Syndrome, Thyroid Stimulating Hormone, Interleukin 6, Hypercytokinemia, Hypothyroidism.

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is a growing public health problem which is a very common and leading cause of infertility in women. PCOS is a condition in which women’s levels of sex hormone, like estrogens and progesterone, are imbalanced [1].

Cytokines play a major role in response to the inflammatory stimuli and tissue damages. Human interleukin 6 (IL-6) is a 184 AA polypeptide with potential O- and N-glycosylation sites and a significant homology with G-CSF. IL-6 is produced by various cells, including T and B cells, monocytes, fibroblasts, endothelial and mesangial cells, several tumor cells and different types of adipose tissue cells, hepatocytes, and ovarian follicular granulosa. Also, it regulates the growth and differentiation of various cell types with major activities on the immune system, hematopoiesis and inflammation. The elevation of serum IL-6 precedes that of acute phase proteins, e.g. in a postoperative phenomenon and may thus be a sensitive early parameter to investigate inflammatory conditions. IL-6 signaling molecule is associated with hyperandrogenism and PCOS, or influence hyperandrogenic phenotypic traits [2].

The effects of abnormal thyroid levels relates largely to changes in ovulation and menstruation. Ovulation may be impaired by changes in the production of sex hormone binding globulin (SHBG), follicle stimulating hormone (FSH), estrogen and androgens. The body compensates by altering the production of thyroid releasing hormone (TRH) from the hypothalamus. The changes in TRH will affect the feedback loop between the hypothalamus, pituitary and the ovary leading to changes in ovulation and menstruation. Early stages of thyroid dysfunction (before symptoms are manifest) can lead to subtle changes in ovulation and endometrial receptivity, which then may have profound effects on fertility [3].

Thyroid stimulating hormone (TSH) stimulates thyroid hormone (TH) synthesis in the thyroid gland, but seems to have other functions as well in the female reproductive tract. The receptors of both TH and TSH increase in the receptive endometrium, thus, they increase the endometrium thickness suggesting that they are important for implantation. However, it is likely that
the thyroid system is important for both follicular and embryonic development \(^4\).

Goodarzi et al.\(^5\) found a significant association between thyroid function, as reflected by TSH \(\geq 2\) mIU/L, and insulin resistance in patients with PCOS. Polymorphism in TH-associated protein, a co-factor in TR regulation, could also offer an explanation to the relation between PCOS and the thyroid system \(^6\).

Andreeva \(^7\) found that thyroid hormones are associated with a number of aspects of the human reproduction. Both states, hyperthyroidism and hypothyroidism, have significant effect on the estrogen and androgen metabolism, the menstrual function and on fertility. The role of thyroid hormones (TH) during infertility has been little exploited. An interesting fact is that TH deficiency is more common in women with PCOS and in certain cases with unexplained infertility.

The purpose of this study was to investigate the biochemical indexes of chronic inflammation, including IL-6 and TSH, T4 and T3 of hypothyroidism, in PCOS patients.

PATIENTS, MATERIALS AND METHODS

This study was conducted during the period from November 2017 to April 2018. Data collection was performed in Kamal Al-Samarrai hospital, Baghdad, Iraq. The total number of participants was 100 included 50 infertile Iraqi women and 50 Healthy controls. Every participant woman has been interviewed and asked to orivide information regarding sociodemographic data, menstrual history, gynecological surgery, obstetric, PCOS family histories. They have been also subjected to medical checkup for signs of hyperandrogenism and polycystic ovary.

**Body Mass Index (BMI)**

Body mass index (BMI) has been estimated by measuring an individual’s weight and height to lean body mass. The BMI is thus an index of weight adjusted for stature. Body mass index has been figured by dividing weight in kilograms by height in meters squared.

\[
\text{BMI} = \frac{\text{Mass (Kg)}}{\text{height (m)}}^2
\]

The BMI is a diagnostic tool for both obesity and protein energy malnutrition \(^8\).

**Human Interleukin-6**

The assay procedure for IL-6 determination, the kit bay form Pepro Tech company / UK. The assay was carried out following the instructions in the kit’s leaflet color development were monitored with ELISA plate reader and absorbance was measured at a wavelength of 405nm.

**Hormonal analysis Kits (Thyroid Tests)**

Total thyroxin (T4) ELISA and Thyroid stimulating Hormone (TSH) ELISA and Triiodothyronine (T3) ELISA kits produced by Foresight (ACON) Company, USA. The color intensity, which is inversely proportional to the amount of Total T4 and T3 present in the specimen, is measured with a microplate reader at 450nm.

**STATISTICAL ANALYSIS**

The Statistical Analysis System- SAS \(^9\) program was used to signify the effects of different factors on study parameters. \(t\)-test was used to compare between means. Estimate of correlation coefficient between variables in this study.

**RESULTS AND DISCUSSION**

The control group consisted of healthy women who were without any systemic disorder. All of the women in the control group had regular menses, every 21–35 days. None of the women in the control group had polycystic ovary on ultrasound (Table 1). In this study, we found highly significant elevation (\(p<0.01\)) in the age of women with PCOS as compared with control women. Previous studies agreed with this finding \(^10-11\).

BMI (kg/m\(^2\)) was analyzed as \(27.91\pm0.65\) for patients and \(25.44\pm0.67\) for controls with high significant difference (\(P<0.01\)). These results was in agreement with another study by Cresswell et al. \(^12\) who found that both obesity and polycystic ovaries increase insulin resistance. The presence of polycystic ovaries appears to have a stronger influence than obesity on insulin resistance.

The relationship between Human interleukin 6 (IL-6) and polycystic ovary syndrome (PCOS) is shown in Figure 1 and Table 1. Women with PCOS exhibited higher plasma concentrations of IL-6 than controls who had intermediate values, or normal-weight controls who had the lowest values (43.83±3.38 vs 35.01±1.31 pg/mL,
Table 1: Age, BMI and IL-6 levels of patients and controls.

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean±SE</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age (year)</td>
<td>BMI (kg/m²)</td>
<td>IL-6 (pg/ml)</td>
</tr>
<tr>
<td>Patients</td>
<td>26.38±0.63</td>
<td>27.91±0.65</td>
<td>43.83±3.38</td>
</tr>
<tr>
<td>Controls</td>
<td>29.13±0.85</td>
<td>25.44±0.67</td>
<td>35.01±1.31</td>
</tr>
<tr>
<td>t-Test</td>
<td>2.073 **</td>
<td>1.883 **</td>
<td>8.150 *</td>
</tr>
<tr>
<td>P-value</td>
<td>0.0098</td>
<td>0.0107</td>
<td>0.0342</td>
</tr>
</tbody>
</table>

* (P<0.05), ** (P<0.01).

Table (2) shown that PCOS patients exhibited significant increase in TSH compared to controls, (0.789±0.10 vs. 0.633±0.09, respectively; P<0.05) and slightly decreased total thyroxin (T4) level (7.47±1.04 vs. 9.15±3.12, respectively, P>0.05) this finding could be due to hypothyroidism while the serum triiodothyronine (T3) showed significant difference (1.809±0.26 vs. 0.946±0.09, respectively, P<0.01) this finding could be due to hyperthyroidism (Figures 2, 3 & 4, respectively). These findings were close to the study done by Abdulrasul Khazali et al. [14]. In another study it was concluded that values of estrogen in controls to that of PCOS cases showed slight increase in levels of estrogen [15]. High levels of androgens in PCOS peripherally converted to estrogens may lead to their increased concentration. High levels of estrogen in PCOS patients have also been reported in other studies [16-18].

Sinha et al. [11] found that high prevalence of thyroid disorders in PCOS patients points towards the importance of early correction of hypothyroidism in the management of infertility associated with PCOS [17]. Zubair [19] studied the dietary habits especially water intake among polycystic ovary syndrome cases to identify...
its effect on the management plan, in order to generate hypothesis for future intervention study that may help millions of polycystic ovary syndrome patients. The study reported that 98% and 96.4% of patients showed dramatic response, regarding menstrual irregularity and sonographic improving pictures, respectively, after initiation of treatment for 2, 4 or 6 months.

**Table 2 Serum levels of TSH, T₃ and T₄ in women with PCOS and their healthy controls**

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean ± SE</th>
<th>T₃ (pg/ml)</th>
<th>T₄ (mg/ml)</th>
<th>TSH (µIU/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>1.809±0.26</td>
<td>7.47±1.04</td>
<td>0.789±0.10</td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td>0.946±0.09</td>
<td>9.15±3.12</td>
<td>0.633±0.09</td>
<td></td>
</tr>
<tr>
<td>t-Test</td>
<td>0.645 **</td>
<td>5.846 NS</td>
<td>0.128 *</td>
<td></td>
</tr>
<tr>
<td>P-value</td>
<td>0.0093</td>
<td>0.567</td>
<td>0.039</td>
<td></td>
</tr>
</tbody>
</table>

* (P<0.05), ** (P<0.01), NS: Non-Significant.

Data are expressed as mean±standard deviation

**CONCLUSION**

PCOS is on the rise in hypothyroid patients. Identification of hypothyroidism may help us treat and prevent fertility complications in PCOS females. Hypothyroidism needs to be early corrected in the management of infertility associated with PCOS which is of major concern these days.

**Ethical Clearance:** Obtained from the Research Ethics Committee at Kamal Al-Samarrai hospital, Baghdad, Iraq.

**Source of Funding:** Self-funded.

**Conflict of Interest:** Nil.

**REFERENCES**

4. Stavreus Evers A. Paracrine Interactions of Thyroid Hormones and Thyroid Stimulation Hormone in the Female Reproductive Tract have an Impact on Female Fertility. Frontiers in Endocrinology 2012;


Effects of Cefotaxime on Histopathological Changes in Rabbit Model of Infected Fractured Ulna

Ali H. Saliem

Department of Physiology, Biochemistry and Pharmacology, College of Veterinary Medicine, University of Baghdad, Iraq

ABSTRACT

**Background:** Cefotaxime is a third-generation cephalosporin antibiotic. Like other third-generation cephalosporins, cefotaxime is a broad-spectrum antibiotic with activity against numerous Gram-positive and Gram-negative bacteria. Current study was aimed to study the activity cefotaxime in bone healing process of infected fractured bone that is caused by *Streptococcus pyogenes* in rabbits. Methods: Current study was performed on rabbit model of ulnar fracture after inducing infected transverse diaphyseal ulnar fracture using pathogenic *Streptococcus pyogenes* (0.025ml from $2.7 \times 10^6$ cfu/ml) directly and healing activity after inducing non-infected fracture cefotaxime in the rabbit ulna directly. This experiment involved 30 rabbits divided into three groups (ten rabbits for each). Results: The results showed that the administration of 0.5gm cefotaxime had reduced the symptoms of infection and succeeded in treating osteomyelitis or reducing *Streptococcus pyogenes* in the infected rabbits, prevented infection and promote fracture healing. Conclusion: Cefotaxime is highly effective for treating bone fractures infected with *Streptococcus pyogenes* with good properties of bone fracture healing.

**Keywords:** Cefotaxime, histopathology, ulnar fracture, osteoblast, macrophages, growth factors.

INTRODUCTION

Cefotaxime is a third-generation cephalosporin antibiotic. Like other third-generation cephalosporins, cefotaxime is a broad-spectrum antibiotic with activity against numerous Gram-positive and Gram-negative bacteria. It has been developed by Hoechst-Roussel Pharmaceuticals in the late 1980s, it was one of the earlier third-generation (extended spectrum) cephalosporins and the first of its class to become available in the United States [1].

Cefotaxime is a β-lactam antibiotic, inhibits bacterial cell wall synthesis by binding to one or more of the penicillin-binding proteins (PBPs). This inhibits the final transpeptidation step of peptidoglycan synthesis in bacterial cell walls. Bacteria eventually lyse due to ongoing activity of cell wall autolytic enzymes (autolysins and murein hydrolases) in the absence of cell wall assembly. Due to the mechanism of their attack on bacterial cell wall synthesis, β-lactams are considered to be bactericidal [3]. Unlike β-lactams such as penicillin and amoxicillin, which are highly susceptible to degradation by β-lactamase enzymes, cefotaxime boasts the additional benefit of resistance to β-lactamase degradation due to the structural configuration of cefotaxime molecule [3]. Consequently, the spectrum of activity is broadened to include several β-lactamase-producing organisms (which would otherwise be resistant to β-lactam antibiotics). Cefotaxime, like other β-lactam antibiotics, does not only block the division of bacteria, including cyanobacteria, but also the division of cyanelles, the photosynthetic organelles of the glaucophytes, and the division of chloroplasts of bryophytes [4].

Cefotaxime is used for a variety of infections including lower respiratory tract infections like pneumonia (*Streptococcus pneumoniae*), genitourinary system infections such as urinary tract infections (caused by *E. coli* or *Streptococcus epidermidis*) and cervical urethral gonorrhea. In addition, it is useful for treatment of gynecologic infections such as endometritis pelvic cellulitis and bacteremia/septicemia which are secondary to *Streptococcus* spp., *S.aureus*, *E.coli*, and *Klebsiella* spp. Also, it is indicated in the treatment of peritonitis, bone and joints infections (caused by...
Streptococcus pyogenes), meningitis, ventriculitis secondary to Neisseria meningitidis, Haemophilus influenza. In meningitis, cefotaxime crosses the blood–brain barrier [5].

Current study was aimed to study the activity cefotaxime in bone healing process of infected fractured bone that is caused by Streptococcus pyogenes in rabbits.

MATERIALS AND METHOD

Activation and maintenance of bacterial isolates

Bacterial cultures were activated in screw capped tubes containing 10ml of brain heart infusion agar slants and incubated for 24 hours at 37 °C. For maintenance of isolates, nutrient and brain heart infusion agar were stored at 4 °C, and were sub-cultured once every two-weeks [6].

Experimental animals

Thirty healthy male local rabbits, aged 8-12 weeks and weighed 1.5-2 kg, were used in current study. Rabbits were housed in metallic cages 90×50×70cm dimensions (2 rabbits/cage), placed in a special housing room belongs to College of Veterinary Medicine/University of Baghdad for acclimatization before experiment. Standard rodent diet (Commercial feed pellets) and water from the tap were freely accessible. The conditions of housing were (20-25 °C) in a conditioned room, and the room quality was changed constantly by ventilation vacuum utilizing. The cycle of light and dark was (14/10) in the housing place.

Induction of Ulna Fracture

After an adaptation period of 2 weeks, the anesthetization of rabbits was done by injecting a mixture of Ketamine hydrochloride (35mg/kg) intramuscularly, 5mg/kg of Xylazine and 0.75mg/kg of Acepromazine [7]. The right ulna was prepared for aseptic surgery.

Twocentimeter incision in the lateral aspect of the right ulna diaphysis was made and then subcutaneous tissues was reflected bluntly to expose ulnar bone. A transverse diaphyseal ulnar fracture was made by using surgical saw.

Inducing bone infection and application of cefotaxime

The challenge dose which induced infection was 2.7 x 10^6cfu/ml of Streptococcus pyogenes suspension [6]. The inoculum preparation standardized according to the viable counting method-pour plate technique by using serial ten-fold dilutions. 0.025ml of bacterial suspension was injected locally at the fracture site by micropipette, simultaneously adding cefotaxime powder locally in the bone fracture of rabbits according to each group. After that the subcutaneous tissue closed by simple interrupted sutures using 3/0 catgut, the skin was closed by simple interrupted sutures using 3/0 silk.

Experimental design

Thirty rabbits were divided equally into 3 groups (ten rabbits in each group), treatment began directly post inducing of fractures and infection, as following:

Group (A) Positive control: Induced fracture of right ulna and infected locally with Streptococcus pyogenes of dosing 2.7 x 10^6 cfu/ml (0.025ml), but not treated.

Group (B) Negative control: Induced fracture of right ulna, not infected and not treated.

Group (C) Induced fracture of right ulna, infected locally with Streptococcus pyogenes of dosing 2.7 x 10^6 cfu/ml (0.025ml) and treated with (0.5gm cefotaxime) locally at the site of fracture.

Histopathology

Animals were euthanized with direct air injection into heart (For each group, five rabbits were sacrificed after 2 weeks and the other five rabbits after 6 weeks of induction of fracture and infection). The dissected specimens of ulna from the sacrificed animals were immediately fixed in a 10% formalin solution, after fixation the specimens were washed with saline for 1-2hrs and transferred to following steps: decalcification, dehydration, clearing, impregnation with paraffin wax, blocking, sectioning and staining with Haematoxylin and Eosin (H.E) stain [8].

RESULTS

The histopathological section of fractured ulna from group A (positive control)) at 2 weeks post fracture showed necrotic neutrophils surrounded by fibrous connective tissue infiltrated by mononuclear cells and neutrophils as well as fibrin networks in fracture gap.
(Figure 1). On the other hand, the sections at 6 weeks post fracture showed granulation tissue infiltrated by mononuclear cells surrounded by necrotic bone, abscess and osteoclast in fragment gap (Figure 2).

Histopathological section of fractured ulna from group B (negative control) at 2 weeks post fracture represented filling of the fracture site with cartilagenous tissue connecting the two segments of fractured bone which was associated with presence of fibrin and inflammatory cells at the fracture gap (Figure 3). On the other hand, the sections at 6 weeks post fracture revealed separated new lamellar bone formation (Figure 4).

The histopathological section of fractured ulna from group C (both infected and treated) at 2 weeks post fracture represented woven bone characterized by highly cellular irregular direction and large spaces in the fracture gap (Figure 5). On the other hand, the sections at 6 weeks post fracture showed thick trabecular bone lining by active osteoblast attachment and lamellar bone with haversian canal (Figure:6).
characterized by highly cellular irregular direction and large spaces (black arrow) in the fracture gap (H&E stain 400X).

Figure 6 Histopathological section of fractured ulna of group (C) at 6 weeks post fracture shows thickness trabecular bone (black arrow) lining by active osteoblast (blue arrow) attached the bone (red arrow) and lamellar bone with haversian canal (green arrow) (H&E stain 400X)

DISCUSSION

The signs in group B (infected but not treated) was in agreement with Kealy et al [9] who mentioned that osteomyelitis was seen by loss of trabecular pattern, which may be the first sign, and lysis or destruction of bone. Fibroblasts migrate to the fracture site, induction of the proliferation and osteogenesis of mesenchymal stem cells or induction of osteogenic differentiation of mesenchymal stem cells via induction/activation of transforming growth factor-beta (TGF-β)/bone morphogenetic protein (BMP) signaling in mesenchymal stem cells.

Mammalian macrophages are able to sense peptidoglycan [10]. Fracture healing requires the induction of mesenchymal stromal cells to differentiate along the osteoblastic lineage for new bone formation. Mesenchymal stem cells proliferation and differentiation are regulated by growth factors. The macrophages have a significant role in expression of inflammatory cytokines and growth factors [11]. Therefore, it has been hypothesized that macrophages have a central role in fracture healing [12]. However, the induction of inflammatory cytokines and fibrosis promoting growth factors by stimulated macrophages suggest a prominent osteolytic effect as the macrophages lose their ability to synthesize BMP-2 under proinflammatory conditions [13]. On this basis, it has been suggested that osseous healing is inhibited by conditions that promote proinflammatory activity of the macrophage [12]. Bacterial peptidoglycan has been shown to be a major stimulus to the inflammatory processes in tissue repair and the peptidoglycans induced a striking increase in the local number of activated macrophages in the tissue [14]. The number of neutrophils, mesenchymal cells and new blood vessels also increase by local application of peptidoglycans. The net effect was an increased accumulation of reparative collagen. These effects have been attributed to the fact that macrophages, when activated, release a number of growth factors including platelets derived growth factor(s), basic fibroblast growth factor, transforming growth factor beta, and angiogenic factor [15]. On the other hand, healing is delayed when wound macrophages are depleted. Peptidoglycans are chemotactic for neutrophils and macrophages [16]. It has been shown that reparative tissue collagens were significantly higher with peptidoglycans and they induce greater inflammatory exudates [17].

In fracture, the initial inflammation is equivalent to other tissue responses to injury. However, during the first days there develops what has been termed the primary callus response. This first callus response is poorly organized and composed of calcified cartilage and woven bone, ultimately remodeled into a mechanically competent bone structure. The biological events in fracture healing are finite and an overshoot in fibroblast tissue regeneration may induce a shift from competent calcified tissue to incompetent fibrous tissue. *Streptococcus pyogenes* induce an alteration in the normal bone healing response towards a less calcified callus production. Mineral density and mineral content were significantly reduced in the bone fractures that were infected with *Streptococcus pyogenes* locally [18]. The administration of 0.5gm cefotaxime showed reducing the symptoms of infection and succeeded in treating osteomyelitis or reducing *Streptococcus pyogenes* in the infected rabbits, prevented infection and promoted fracture healing which may be attributed to mechanism of their attack on bacterial cell wall synthesis, unlike other β-lactams such as penicillin and amoxicillin, which are highly susceptible to degradation by β-lactamase enzymes [3].

CONCLUSIONS

Cefotaxime is highly effective for treating bone fractures infected with *Streptococcus pyogenes* with good properties of bone fracture healing.

Ethical Clearance: Obtained from the Research Ethics Committee at College of Veterinary Medicine/ University of Baghdad, Iraq.

Source of Funding: Self-funded.

Conflict of Interest: Nil.

REFERENCES

2. LeFrock JL, Prince RA, Leff RD. Mechanism of
action, antimicrobial activity, pharmacology, adverse effects, and clinical efficacy of cefotaxime. 

3. Van TT, Nguyen HN, Smooker PM, Coloe PJ. The antibiotic resistance characteristics of non-
typhoidal Salmonella enterica isolated from food-
producing animals, retail meat and humans in 
South East Asia. Int J of Food Micro 2012; 154(3): 
98–106.

chloroplast division in a moss (Physcomitrella 
patens) but not in tomato (Lycopersicon 
esculentum). J of Pla Physio 1997; 150(1–2): 137– 
140.

5. Soma S, Mallika S, Puranjay S, Manideepa SG. 
In-vitro activity of Cefotaxime in the Era of 
Antimicrobial Resistance. Int J of Sci and Res 

Clinical Veterinary Microbiology. Mosby. 
Edinburgh, London, New York, Oxford and 

7. Lipman NS, Marini RP, Erdman SE. A comparison 
of ketamine/xylazine and ketamine/xylazine/ 
acepromazine anesthesia in the rabbit. Lab Anim 

JF, Cabal B. Bone Loss at Implant with Titanium 
Abutments Coated by Soda Lime Glass Containing 
Silver Nanoparticles: A Histological Study in the 

9. Kealy JK, McAllister H, John PG. Diagnostic 
Radiography and Ultrasonography of small 

10. Giardin SE, Travassos LH, Herve M. Peptidoglycan 
molecular requirements allowing detection by 
NOD1 and NOD 2. J Biol Chem 2003; 278(43): 
41702–41708.

11. Danon D, Kowatch MA, Roth GS. Promotion of 
wound repair in old mice by local injection of 

12. Champagne CM, Takebe J, Offenbacher S. 
Macrophage cell lines produce osteoinductive 
signals that include bone morphogenic protein-2. 

and connective tissue production. FASEJ 1994; 

Streptococcus pyogenes and its peptidoglycan 
stimulate macrophage recruitment, angiogenesis, 
fibroplasias and collagen accumulation in wounded 

15. Riches DWH. Macrophage involvement in wound 
repair, remodeling and fibrosis. In: Clark RAF, 
editor. The molecular and cellular biology of 
Wound repair (2nd Ed), New York: Pleneum Press; 
1996: pp.95–141.

16. Dziarski R. Effects of peptidoglycan on the cellular 
components of the immune system. In: Seidl PH, 
Schleifer KH, editors. Biological properties of 
229–247.

17. Liu X, Chang TH, Levenson SM. Wound fluids 
from saline and S aureus peptidoglycan inoculated 
sponges induce expression of metalloproteinase-13 
mRNA by cultured rat fibroblasts. Wound Rep Reg 

Streptococcus pyogenesPeptidoglycan Impairs 
Fracture Healing: An Experimental Study in Rats. 
Anti-Glutamic acid Decarboxylase Autoantibody as Biomarker for Diagnosis of Type 1DM Patients in Iraq

Fuad Ghazi Hassan¹, Mustafa Jawad Abed Al-Imari²

Medical Microbiology/ Al-Mustaqbal University College, Iraq

ABSTRACT

Background: Type 1 diabetes mellitus (T1DM), also known as autoimmune diabetes, is a chronic disease characterized by insulin deficiency due to pancreatic β-cell loss and leads to hyperglycaemia. The T cell-mediated destruction of β-cells is targeting insulin, glutamic acid decarboxylase (GAD), insulinoma-associated protein 2 and zinc transporter. The GAD biomarker of T1DM is found months to years before symptoms onset and can be used to identify and study individuals who are at risk for developing T1DM.

Objective: To evaluate the role of GAD in diagnosis of T1DM and to compare the new diagnostic marker, anti-GAD, associations with future disease activity and compared to type 2 DM.

Material and Method: This study involved fifty six (56) blood and serum samples from patients suffering from T1DM, (12) patients with type 2DM and (12) healthy individuals as controls. The average disease duration was 6.5±0.5 years (1-15 years). Anti-GAD antibody assayed as biomarker parameter for all subjects. Anti-GAD as it was tested by Chorus device (ELISA automated device) as semi quantitative determination. All clinical features were investigated by questionnaire interviews. Data were presented as frequencies and percentages.

Results: Male patients with T1DM appeared to be more affected than women. The results also showed elevated levels of anti-GAD in 51.8% of T1DM. In a random sample of (12) non-diabetic individuals, none had anti-GAD. The sensitivity of the anti-GAD test for T1DM was 82.2% and the specificity was 93%.

Conclusion: Prevalence of Anti-GAD is associated with age. Patients with Type 1DM (Children and adolescents) had increased prevalence of Anti-GAD antibodies. The positivity of anti-GAD antibodies was higher in children and adolescents and less frequent in adult patients involved in this study. So it could be a useful serological assay in establishing the diagnosis of type 1DM and prediction of very high risk for development of T1DM.

Keywords: Anti-GAD, T1DM, Chorus, ELISA, β-cells, ABO blood groups.

INTRODUCTION

T1DM is caused by immune-mediated destruction of pancreatic beta cells and is associated with autoantibodies targeting components of insulin-producing cells: Anti-islet cell (ICA), anti-glutamic acid decarboxylase (anti-GAD), anti-tyrosine phosphatase (anti-IA2), and anti-zinc transporter 8 protein (ZnT8). T1DM has a genetic predisposition, particularly related to some antigens and human leukocyte antigen (HLA) haplotypes [¹]. T1DM is related to several autoimmune diseases such as Graves’ disease, Hashimoto’s thyroiditis, celiac disease (CD), and pernicious anemia, which are more prevalent in this type of diabetes when compared to the healthy population [²].

The immune destruction of pancreatic beta cells is associated with various antigens. Antibodies against some of these antigens are used in clinical practice to...
assist in the diagnosis and classification of diabetes type as well as predictors of the disease \[3\].

The association of T1DM with autoantibodies specific for different organs and tissues remains clinically controversial. There is no exact definition of how and when to screen for autoimmune diseases in these patients and on the ethical aspects involved in the monitoring and treatment, in the case of positive laboratory results \[4\]. One of the hallmarks of autoimmune diabetes is the presence of adaptive responses directed to neuroendocrine proteins. One of these proteins is glutamic acid decarboxylase (GAD). GAD is of specific significance in diabetes and gives the advances in understanding humoral and cellular immunity in T1DM and in a subset of T2DM \[5\].

Autoantibodies against glutamic acid decarboxylase (GAD) are a valuable predictor of risk and progression to overt autoimmune diabetes. The combined positivity to GAD65 and other islet autoantigens in the determination of T1D autoantibodies have reliable and accurate predictive applications \[6\].

Three-quarters of all cases of type 1 diabetes are diagnosed in individuals <18 years of age. The provider must consider the unique aspects of care and management of children and adolescents with T1DM such as changes in insulin sensitivity related to physical growth and sexual maturation \[7\].

**The aim of this study:**

This study was aimed to investigate the prevalence of autoimmune markers for pancreatitis in children and adolescents with T1DM through the search and detection of anti-GAD autoantibodies.

**MATERIALS AND METHOD**

**Subjects:** This study was carried out at Al-Mustaqbal University College and a private laboratory. Samples were collected from Mirjan Teaching Hospital and private laboratories from April 2017 to April 2018. Fifty six (56) patients with Type 1 Diabetes Mellitus (T1DM) were included in this study, their age ranged from one day to forty years. Twelve (12) samples from patients with Type 2 DM and Twelve (12) samples from normal individuals were used as controls in this study with approximately same age to that of patients with T1DM.

**Samples collection:** About 5-10 ml of A blood sample of 5-10ml was collected in disposable test tubes from each participant, centrifuged for ten minutes at 3500 rpm and serum was transferred to disposable test tubes. The serum or plasma sample was stored refrigerated at (2 –8°C) for up to 48 hours. For a longer storage, they were kept at -20°C. The blood and serum samples were used for the several parameters in this study.

**Chorus Trio (anti-GAD)**

Immunoenzymatic method for the semiquantitative determination of antibodies against glutamic acid decarboxylase (anti-GAD) in human serum using disposable device applied on the chorus device. The test was based on the ELISA principle (Enzyme linked Immunosorbent Assay -DIESSE Diagnostica Senese S.p.A. Italy). The antigen is bound to the solid phase. The specific immunoglobulin binds to the Ag through incubation with diluted serum. The disposable devices contain all the reagents to perform the test in the chorus instruments.

**Interpretation of results**

The chorus instrument expresses the result in AU/ml calculated on the basis of a lot-dependent graph stored in the instrument. The result can be interpreted as follows: Positive when the concentration in the sample is < 18 AU/ml, Negative when the concentration in the sample is > 12 AU/ml and Doubtful/equivocal when the concentration in the sample is between 12 and 18 AU/ml.

**RESULTS AND DISCUSSION**

**Descriptive data of study subjects**

This study involved (56) Iraqi patients suffer from T1DM divided into 24 (42.9%) females and 32 (57.1%) males (Table 1). Their mean±SD age was 24±1 year with range from one day to > 40 years (Table 2). Data obtained from these patients were compared with (12) samples taken from normal individuals whom mean age was 33 years and were proved free from diseases.

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>32</td>
<td>57.1</td>
</tr>
<tr>
<td>Female</td>
<td>24</td>
<td>42.9</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 2 Distribution of patients with T1DM according to their gender and age

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>1-10 year</td>
<td>7</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>11-20 year</td>
<td>10</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>21-30 year</td>
<td>11</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>31-40 year</td>
<td>4</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>24</td>
<td>56</td>
</tr>
</tbody>
</table>

Although many of autoimmune diseases disproportionately affect females in the majority of the cases, the occurrence of this disease in this study was more in males than in females. In this study, the result showed slight differences and agreed with several previous studies. Many reports indicated an excess of T1DM cases in male adults after pubertal years (male-female ratio ≥1.5) in populations of European origin [8].

Distribution of T1DM cases according to the age and gender of patients

The study T1DM subjects were divided into four groups according to their age (Figure 1). The results showed slight difference between early childhood and adulthood age groups. However, the incidence declined after puberty and appeared to stabilize in the age group (31-40) years (Table 2 & Figure 1). Factors such as hormones or high sexual activity may be associated.

The results obtained from this study suggested that there was a positive association between blood group A and T1DM and negative association between B, O and AB blood groups with T1DM. So that, blood group A group patients are having 50% chance of getting T1DM (Table 3). Large studies in other ethnic groups were needed to confirm these results.

Table 3 Association between ABO blood groups and incidence of T1DM

<table>
<thead>
<tr>
<th>Age group of T1DM patients</th>
<th>Blood Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>1 day-10 year</td>
<td>8</td>
</tr>
<tr>
<td>11-20 year</td>
<td>6</td>
</tr>
<tr>
<td>21-30 year</td>
<td>10</td>
</tr>
<tr>
<td>31-40 year</td>
<td>4</td>
</tr>
<tr>
<td>Total (%)</td>
<td>28(50)</td>
</tr>
</tbody>
</table>

Serological tests

Anti-GAD level among T1DM patients

Depending on the age of participants, all patients and controls were divided into four groups. Anti-GAD was performed for all participants in this study. Anti-GAD was found positive in one (1) patient with type 2 DM and negative in all healthy controls. We found elevated anti-GAD in 29 patients with T1DM (51.8 %). Also, the results of current study showed an elevated Anti-GAD titer among patients in age group 21-30 years (Table 4).

Table 4 Anti-GAD test results for patients with T1DM

<table>
<thead>
<tr>
<th>Age group</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 day-10 year</td>
<td>6</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>11-20 year</td>
<td>7</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>21-30 year</td>
<td>12</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>31-40 year</td>
<td>4</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>27</td>
<td>56</td>
</tr>
</tbody>
</table>
For all three methods and tests performed in this study sensitivity, specificity and accuracy in percentages (Table 5) were measured as follows:

Sensitivity = \( \frac{\text{True Positive TP}}{\text{True Positive TP} + \text{False Negative FN}} \)

Specificity = \( \frac{\text{True Negative TN}}{\text{True Negative TN} + \text{False Positive FP}} \)

Accuracy = \( \frac{\text{TP} + \text{TN}}{\text{TP} + \text{FP} + \text{FN} + \text{TN}} \)

**Table 5 Sensitivity, Specificity and accuracy for Anti-GAD test**

<table>
<thead>
<tr>
<th>The Method</th>
<th>Sensitivity %</th>
<th>Specificity %</th>
<th>Accuracy %</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>H. pylorie</em> IgG by Rapid Kit</td>
<td>82.2%</td>
<td>93%</td>
<td>88.5%</td>
</tr>
</tbody>
</table>

**DISCUSSION**

In this study we tried to testify the correlation between existence of anti-GAD antibodies, on the one hand, and age and gender of patients with T1DM, on the other hand. In addition, to testify the duration and onset of disease as well as sensitivity and specificity of this marker in diagnosis of T1DM. Our data confirmed the effect of age in this type of DM as they showed that there is a moderate frequency of anti-GAD-positive in adult patients with T1DM. Other studies revealed that the prevalence of anti-GAD antibodies among Asian population was relatively low compared with that of Caucasians [9].

Current study showed a slightly higher frequency of Anti-GAD antibodies among males than females (57.1% vs 42.9%). Another study conducted by [10], they revealed a higher frequency of anti-GAD among girls than boys (75% vs 63%).

The immune destruction of pancreatic beta cells is associated with various antigens. Antibodies against some of these antigens are used in clinical practice to assist in the diagnosis and classification of diabetes type [3]. These include anti-GAD, ICA, anti-tyrosine phosphatase (anti-IA2), anti-insulin (IAA), anti-antigen 2 associated to insulinoma (IA-2), and ZnT8 antibodies. The ICA is characteristic of the onset of T1DM and its serum levels decrease each year after diagnosis. The ZnT8 comes later than the anti-GAD and IAA [11]. IAA has a little value after onset of insulin therapy [12].

Autoimmune diabetes in adults is as prevalent as childhood-onset T1DM, but the clinical phenotype ranges from insulin-dependent to non-insulin dependent. Recent studies revealed an association with HLA DQ8, HLA DQ2 and glutamic acid decarboxylase autoantibodies. However, GADA continue to appear in serum of adults at risk for DM, so the genetic events initiate autoimmune diabetes even after childhood. In other words, the HLA-mediated dominant protection typical of childhood-onset T1DM is lost in adult-onset autoimmune diabetes. The likely role of antigen-specific T regulatory cells for this HLA-mediated dominant protection provides clear inference that an aggressive adaptive immune response is less vital in adult-onset disease [13]. The prevalence of anti-GAD is higher in older children [3].

The cell destruction associated with T1DM increases the release of GAD. This may explain the delayed appearance of anti-GAD compared to ICA. The presence of anti-GAD one month after diagnosis of T1DM is related to the rapid loss of beta cells function [14]. The persistent positivity of anti-GAD can be used to predict other autoimmune diseases in children with T1DM [15].

**Association of disease duration with sensitivity specificity of Anti-GAD**

The mean duration of the patient with anti-GAD-positive compared with that in negative patients was 6.5±0.5 years (1-15 years). In serial observations, it appeared to be constant with longer disease duration, but decreased when the duration of disease is longer than 8 years, for that it maybe useful to use anti-GAD as an indicator for monitoring the diseases activity especially with long standing disease duration. This data may provide a benefit for clinicians to discuss the results of this autoantibody in clinical practice. Also, it can be used to predict risk for T1DM in future and to classify individuals with diabetes as having β-cell destructive process. Tridgell et al. [16] found significant association of GADA with duration of disease among younger and elderly people.

The result showed moderate sensitivity and high specificity (82.2% and 93%, respectively) with 85.5% accuracy of this result which may give a reason to use this marker in diagnosis of T1DM and other types in patients with risk factor of DM. Moreover, in other study [17], the sensitivity and specificity were (82.1 % and 100%, respectively) for predicting T1DM.
Acknowledgment: Thanks to all patients who participated in this study. Also, are extended to Al-Mustaqbal University College, privet laboratory in Al-Hilla town, and Mirjan Medical City for their collaboration and assistance.

Ethical Clearance: Obtained from the Research Ethics Committee at Al-Mustaqbal University College and Mirjan Medical City, Babylon City, Iraq.

Source of Funding: Self-funded.

Conflict of Interest: Nil.

REFERENCES

Study of Serum Antioxidants, Trace Elements and Leptin Levels in Epilepsy Patients

Shihab A Al-Bajari¹, Nashwan I AL-Lehebe², Labeeb H. AL-alsadoon¹
¹Mosul Technical Institute/ Northern Technical University, Mosul, Iraq,
²Department of Chemistry/ College of Education/ University of Mosul, Mosul, Iraq.

ABSTRACT

Background: Epilepsy is a set of chronic neurological disorders characterized by seizures. Nearly 90% of epileptic patients are found in developing countries. Epileptic seizures result from abnormal, excessive or hyper synchronous neuronal activity in the brain. The aim of the study was to monitor the changes in leptin level, trace elements and enzymatic antioxidants (glutathione peroxdiase (GPx), superoxide dismutase (SOD) and Catalase (CAT) as well as glutathione (GSH) and Malondialdehyde (MDA) as oxidative stress marker in epilepsy patients after treatment with Depakine. Method: The total number of subjects included in this study was 30 epilepsy patients compared with 35 normal healthy controls. The two groups were compared in light of the measured variables. Results: The results showed a significant decrease (P<0.05) in concentrations of GPx, SOD and GSH in comparison with normal control group; whereas significant increase (P<0.05) in leptin level and MDA concentration compared with normal control group. In addition, the results of trace element showed a significant decrease (P<0.05) in concentrations of Zinc , Copper and Selenium; whereas did not observe significant differences (P<0.05) in, iron, Magnesium and Nickel concentrations compared with normal control group. Conclusion: The data of the present study suggested that oxidative stress marker and serum leptin levels seem to reflect diseased activity in epilepsy patients who use Depakine as a treatment.

Keywords: epilepsy, trace elements, enzymatic antioxidants, leptin hormone, depakine, SOD, Catalase.

INTRODUCTION

In recent decades, the prevalence of epilepsy has increased alarmingly, making it a significant health problem. Epilepsy is one of the most common and serious brain disorders in the world. It affects at least 50 million people worldwide. Approximately100 million people will have at least one epileptic seizure during their lifetime. It causes serious physical, psychological, social and economic consequences [¹]. The median prevalence of lifetime epilepsy for developed countries is 5.8 per 1,000 and 10.3 per 1,000 for developing countries [²]. Epilepsy is the third most common type of brain diseases in old age, after stroke and dementias [³]. Free radicals have a role in the regulation of biological functions, damage to cell structures as well as in the pathogenesis of central nervous system neurodegenerative diseases such as Parkinson’s disease, stroke, and dementias [⁴]. Studies suggested that neurodegenerative diseases may develop characteristics of epilepsy with time [⁵]. Oxidative and nitrosative stress are regarded as possible mechanisms in the pathogenesis of epilepsy [⁶]. Valproic acid (VPA), which was first marketed as (Depakine) in France [⁷], is an effective anticonvulsant that is relatively free of central nervous system side effects. It is useful in controlling a broad range of clinical convulsive disorders, primarily the treatment of epilepsy patients [⁸]. Leptin, (from the Greek word leptos, means thin) is a peptide hormone secreted from adipose tissue and it influences energy homeostasis, immune and neuroendocrine functions. In humans, it is well-established that plasma leptin levels are directly proportional to percentage body fat. Most obese individuals have high concentrations of leptin in their serum and blood plasma [⁹]. Trace elements are found in small quantities in the body, but have important structural functional roles in a variety of biological processes. The equilibrium of trace elements is essential for a healthy nervous system due to their key roles in

DOI Number: 10.5958/0976-5506.2019.00390.5
activation of specific enzymes in many pathways of the central nervous system function and metabolism. Anti-oxidative defense mechanisms are important pathways involving trace elements \[10\]. Zinc the most important elements in the body that is necessary for normal brain function. Also, it is an important cofactor for different enzyme such as DNA and RNA polymerases \[11\]. The aim of this study was to compare serum leptin level in Epilepsy (treatment by depakene) with trace element and oxidative stress.

**MATERIAL AND METHOD**

In the present study, Leptin, trace element and oxidative stress marker tests were measured for 65 individuals (35 control and 30 epilepsies patients).

**Sample collection, handling and storage**

Under aseptic conditions, five milliliters of blood were collected from each patient and control individual. The blood sample was then centrifuged and the serum separated and kept frozen at $-20^\circ C$.

**ELISA test for leptin**

Leptin was assayed by ELISA using monobind, France Kit by DIA source Belgium which depends on the Immunosorbsent \[12\].

**Assay for trace elements**

Zinc, Copper, Iron, Magnesium, Nickel and Selenium were analyzed by atomic absorption spectrometry.

**Assay for Malondialdehyde and Glutathione**

Malondialdehyde (MDA) levels were measured as per thiobarbituric Acid (TBA) method described by Yao-Yuan \[13\]. The Glutathione (GSH) concentration was measured according to the method of Beutler et al. \[14\].

**Assay for antioxidant enzymes (SOD, CAT, Gpx ) activity**

(SOD) activity was measured by colorimetric assay \[15\]. Catalase activity was estimated by the method of Aebi \[16\]. Gpx activity was measured by the method of Rotruck et al. \[17\].

**Statistical analysis**

All values were reported as mean±SEM. Statistical significance was assessed using Student’s $t$-test. P value less than 0.05 was accepted as the level of significance.

**RESULTS**

Descriptive data of the control individuals and epilepsy patients included in the study are presented in Table 1.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Controls (n=35)</th>
<th>Epilepsy patients (n=30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/years (Mean±SD)</td>
<td>37±5.3</td>
<td>36±4.4</td>
</tr>
<tr>
<td>Sex (Male/Female)</td>
<td>18/17</td>
<td>13/17</td>
</tr>
<tr>
<td>BMI/ (kg.m(^{-2})) (Mean±SD)</td>
<td>23±3.3</td>
<td>25±2.6</td>
</tr>
<tr>
<td>Duration of Epilepsy/years (Mean±SD)</td>
<td>--</td>
<td>12±2.2</td>
</tr>
<tr>
<td>Dose of Depakine (mg)</td>
<td>--</td>
<td>200</td>
</tr>
</tbody>
</table>

**Statistical analysis**

All values were reported as mean±SEM. Statistical significance was assessed using Student’s $t$-test. P value less than 0.05 was accepted as the level of significance.

**RESULTS**

Descriptive data of the control individuals and epilepsy patients included in the study are presented in Table 1.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Controls (Mean±SD)</th>
<th>Epilepsy patients (Mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDA(μmol/L)</td>
<td>4.16±0.32</td>
<td>7.33±1.2*</td>
</tr>
<tr>
<td>GSH(μmol/L)</td>
<td>14.95±0.56</td>
<td>9.31±1.1*</td>
</tr>
<tr>
<td>CAT (U/mL)</td>
<td>3.1±0.64</td>
<td>2.7±0.7</td>
</tr>
<tr>
<td>GPx(U/ML)</td>
<td>0.67±0.11</td>
<td>0.55±0.09*</td>
</tr>
<tr>
<td>SOD (U/ML)</td>
<td>7.22±2.1</td>
<td>4.34±1.7*</td>
</tr>
<tr>
<td>Leptin (ng/ml)</td>
<td>4.9±1.4</td>
<td>10.3±2.1*</td>
</tr>
</tbody>
</table>

*Significant (P<0.05) compared to control (Student’s $t$-test).
Table 3 Serum levels of trace elements for epilepsy patients treated with Depakine and their healthy controls.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control (Mean±SD)</th>
<th>Epilepsy patients (Mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=35</td>
<td>n=30</td>
</tr>
<tr>
<td>Zn (µg/dl)</td>
<td>167±5.4</td>
<td>97±6.4*</td>
</tr>
<tr>
<td>Cu (µg/dl)</td>
<td>67±3.3</td>
<td>53±4.4*</td>
</tr>
<tr>
<td>Fe (µg/dl)</td>
<td>92±5.1</td>
<td>96±5.3</td>
</tr>
<tr>
<td>Mg (µg/dl)</td>
<td>0.73±0.2</td>
<td>0.78±0.2</td>
</tr>
<tr>
<td>Ni (µg/dl)</td>
<td>0.84±0.2</td>
<td>0.83±0.3</td>
</tr>
<tr>
<td>Se (µg/dl)</td>
<td>76±4.3</td>
<td>50±2.9*</td>
</tr>
</tbody>
</table>

* Significant (P<0.05) compared to control (Student’s t-test).

**DISCUSSION**

The mean serum leptin concentration in epilepsy patients using Depakine (VPA) as drug in this study was 10.3ng/ml, higher than those in the control group 4.9ng/ml (Table 2). Leptin levels were found to be high in this group with weight gain compared with control group [18]. Investigated serum leptin levels in epilepsy patients and examined risk predictors affecting weight gain. However, in our study, leptin levels were also high in the VPA group subjects, even though there was no significant weight gain in the VPA group. We therefore think that leptin may be related to insulin resistance [19].

In the present study, serum GSH levels were decreased while MDA levels were increased significantly compared with control group, suggesting the generation of free radicals in epilepsy. Current study was in agreement with Liu et al. [20] as well as with Solowiej et al. [21]. In present study, SOD, GPx and CAT activities were low (39%, 17% and 13%, respectively) compared to controls. Several previous studies had demonstrated that antiepileptic drugs (AEDs) may impair the antioxidant defense system and induce or exacerbate oxidative injury in epileptic patients. Several antiepileptic drugs such as valproic acid increase nucleic acid oxidation and lipid peroxidation in the blood [22]. Cengiz et al. [23], evaluated the effects of VPA and carbamazepine on the levels of GSH, GPX, SOD, CAT and lipid peroxidation in the erythrocytes of children diagnosed with epilepsy and compared with healthy children. The authors found that treatment with VPA had significantly increased GPx levels, but the GSH and CAT levels were significantly decreased. With combined drugs, there were no significant differences in the SOD activity and lipid peroxidation levels [23]. A decrease in the levels of SOD, CAT, GPX and GSH. These results suggested that there might be a deficiency in Cystatin B that increases susceptibility of cerebellum to oxidative damage and especially to lypoperoxidation. Additionally, it was shown that Cystatin B is a gene inducible by oxidative conditions through the activation of the transcription factor Sp1 (a factor associated with the inducible transcriptional response to oxidative stress) which in turn binds to a promoter of Cystatin B [24]. Therefore, researchers are now focusing on developing add-on treatments for epilepsy therapies to counteract the increase in oxidative stress induced by anti-epileptics drugs and seizures. The relationship between epilepsy and trace elements levels on pathophysiological basis is a matter of debate. In the current study patients’ serum trace elements showed a significant decrease (P<0.05) in concentrations of Zn, Cu and Se which were about 41%, 20% and 34%, respectively. This finding disagreed with Karimooy et al. [25] who found increased concentrations of Zn, Cu. However, it agreed with Ashrafi et al. [26] who found low levels of Se in patients with epilepsy. Selenium is an essential co-factor for glutathione peroxidase while Copper is essential for ceruloplasmin which plays an important role in antioxidant defense [27,28]. Therefore selenium and Copper were decreased in epilepsy patients as a result of defending against oxidative stress resulted from this disease.

**Ethical Clearance:** Obtained from the Ethical and the Scientific Committee at College of Education/ University of Mosul, Mosul, Iraq.

**Source of Funding:** Self-funded.

**Conflict of Interest:** Nil.

**REFERENCES**


Assessment of the Impact of Platelets-Rich Fibrin on Healing Process after Teeth Extraction

Mohammed Rhael Ali, Sabah Abdul Rasool Hammoodi

Department of Oral and Maxillofacial Surgery, College of Dentistry/University of Tikrit, Iraq

ABSTRACT

Background: There has been an increased focus on bioactive materials to regulate and improve healing process after tooth extract in recent years. Therefore, current study was conducted to evaluate the impact of platelet-rich fibrin (PRF) method on improving soft tissue healing and socket complications after tooth extraction. Methods: Forty patients both males and females who attended for dental extraction, were divided into two equal groups; one group of patients received PRF following teeth extraction and the other allowed for physiological healing. Both groups were followed seven days post extraction. Results: The results revealed that there was significant decrease of haemostatic time in experimental group as compared to control group. Also, soft tissue healing was significantly better (P<0.01) in experimental group. However, all patients did not reveal any difference in socket infection. In conclusion, PRF was safe, inexpensive and easy to use with efficiency in oral and maxillofacial human surgery.

Keywords: PRF, tooth extract, soft tissue healing, growth factors, fibrin.

INTRODUCTION

Dental extraction (exodontia) is the removal of teeth from the dental alveolus in the alveolar bone that maybe caused by dental trauma, infection or periodontal diseases [1].

Healing process, after tooth extraction, is a delicate process which includes three stages: Inflammation (Coagulum, Epithelialization), proliferation (Neovascularization, Matrix synthesis and maturation) and Collagen synthesis [2]. First step in healing process is the formations of blood clot that begins by vasoconstriction to decrease the bleeding followed by platelets activation which aggregate and act as a plug to stop bleeding then, they release their contents of mediators which regulate healing process by attracting macrophages and neutrophils to secrete cytokines and growth factors. In addition, they activate smooth tissue and fibroblasts [3]. The dental socket is colonized by granulation tissue, consisting of blood vessels, immune cells and red blood cells during the first 1-2 weeks following tooth extraction [4,5].

Soft tissue becomes keratinized and woven bone formed and fills the socket at the 4th–6th week after tooth extraction. At the 4th–6th month, woven bone is reinforced by deposition of additional minerals within it [5,6].

Platelet-rich fibrin (PRF), a new generation of platelet concentration rich in fibrin, platelets, leukocytes, growth factors, cytokines (IL-1, IL-6, IL-4 and TNF-α) and other materials involved in tissue repair [7]. Growth factors are proteins that play an important role in cellular growth, proliferation, differentiation and healing. They are stored in platelets and secreted upon platelets activation giving the platelets crucial role in wound healing and regeneration of injured tissues besides their haemostatic functions [8]. The PRF is characterized by safety, efficiency and being simple in preparation, handling as well as application in the indicated local [9].

Complications associated with permanent dental extraction are more frequently like delayed healing and pain [10]. Therefore, current study was aimed to investigate the impact of PRF in improving tissue healing, regeneration and decrease the complications...
after tooth extraction

**METHODOLOGY**

**Study design**

The current study was conducted on 40 patients who were attending to dental clinic in Tikrit University/College of dentistry for teeth extractions, some of them extracted hopeless carious tooth for future removable and fixed restoration therapy and others were suffering from partial impacted third molar. The age of patients ranged from 22-54 years. Patients were interviewed directly by using an anonymous questionnaire which covered age, sex and medical history. Patients without history of systemic disease, non-pregnant women and those not having blood disease were included in this study. On the hand, patients with diabetic, osteoporosis, bone diseases and any systemic disease that may affect the healing process were excluded. This study was in agreement with Declaration of Helsinki guidelines and was approved by the Research Ethics Committee at Tikrit Teaching Hospital and Ministry of Health, Iraq.

The patients were divided into: experimental group (n=20), including patients who had teeth extract and treated with PRF, control group (n=20) including patients who had teeth extract but allowed for normal healing after extraction.

**Assay of PRF preparation:** Before tooth extraction, 5ml of venous blood were collected from all patients then put in sterile plain tube and centrifuged for ten minutes at 3000 rpm to separate the blood into 3 layers; the top one is the cellular plasma, the middle layer is the PRF whereas red blood cells were located in the lowest layer. The PRF then collected using sterile tweezers while other layers were removed from the PRF gel. The PRF clot was then placed on the grid in the PRF Box slightly adapted by PRF kit (ProcessLtd Pakistane) to be used later on.

**Clinical procedure**

Under aseptic conditions, all patients were given local anesthesia of 2% lidocaine HCl with epinephrine 1:100,000. The selected teeth were extracted by simple extraction and some of them by surgical extraction (A mucoperiosteal flap) with minimal trauma. PRF clot implanted in socket after extraction in experimental group of patients while the control sockets left to normal healing. Teeth were extracted by simple extraction, pressure application and figure 8 suture using 3–0 silk sutures. On the other hand, teeth extracted by surgical extraction were closed by interrupted suture. All patients received the same post-operative treatment with antibiotic treatment for 5 days and an analgesic when needed. Sutures removed on the seventh postoperative day.

**Evaluation of the healing process after PRF treatment**

Patients were evaluated for healing process for seven days after surgery which included perception of pain, soft tissue healing according to healing index [11] which depends on tissue color, presence of bleeding on palpation, epithelialization of wound margins, granulation tissue formation and suppuration.

Socket complications were evaluated following the criteria described by [12] and as follows: infection in socket was observed by painful socket, pus collection with swelling, and erythema in combination with an elevated body temperature.

**Statistical analysis**

Statistical analyses were done using computer-based software, Statistical Package for Social Sciences (SPSS version 20), in association with Microsoft Excel 2010. Data were expressed as mean±standard deviation. Analysis of variance was used to compare between groups. An estimate was considered statistically significant at P ≤ 0.05.

**RESULT**

The results of current study revealed that there was non-significant difference between experimental and control groups in terms of their gender and median age, yet there was highly significantly difference (p ≤ 0.05) between groups in haemostatic times as shown in Table (1).
Table 1 Distribution of patients according to gender, age and haemostatic time

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Patients with PRF treatment (n=20)</th>
<th>Patients without PRF treatment (n=20)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6 (30%)</td>
<td>8 (40%)</td>
<td>0.04</td>
</tr>
<tr>
<td>Female</td>
<td>14 (70%)</td>
<td>12 (60%)</td>
<td></td>
</tr>
<tr>
<td>Age/year (Mean±SD*)</td>
<td>30±6.8</td>
<td>32±7.6</td>
<td></td>
</tr>
<tr>
<td>Haemostatic time</td>
<td>No.(%)</td>
<td>No.(%)</td>
<td></td>
</tr>
<tr>
<td>&lt; 2 hrs</td>
<td>13(65%)</td>
<td>3(15%)</td>
<td></td>
</tr>
<tr>
<td>&lt; 4 hrs</td>
<td>3(15%)</td>
<td>9(45%)</td>
<td>0.05</td>
</tr>
<tr>
<td>&gt;4 hrs</td>
<td>4(20%)</td>
<td>8(40%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>20(100%)</td>
<td>20(100%)</td>
<td>40</td>
</tr>
</tbody>
</table>

* Standard Deviation.

The results explain that insignificant difference between patient treated with PRF after surgery and patients left to physiological healing in socket infection (Table 2)

Table 2 Assessment of the socket infection signs in experimental and control groups

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Patients with PRF treatment No.(%)</th>
<th>Patients without PRF treatment No.(%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs of infection</td>
<td>8(40%)</td>
<td>10(50%)</td>
<td>18</td>
</tr>
<tr>
<td>No signs of infection</td>
<td>12(60%)</td>
<td>10(50%)</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>20(100%)</td>
<td>20(100%)</td>
<td>40</td>
</tr>
</tbody>
</table>

The results also illustrated that patients treated with PRF after tooth extraction exhibited better healing than patients not treated with PRF with a significant difference between them (Table 3)

Table 3 Comparison between experimental and control groups according to soft tissue healing after one week

<table>
<thead>
<tr>
<th>Healing process</th>
<th>Patients with PRF treatment No.(%)</th>
<th>Patients without PRF treatment No.(%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>12(60%)</td>
<td>2(10%)</td>
<td>0.04</td>
</tr>
<tr>
<td>Good</td>
<td>4(20%)</td>
<td>8(40%)</td>
<td></td>
</tr>
<tr>
<td>Accepted</td>
<td>4(20%)</td>
<td>10(50%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>20(100%)</td>
<td>20(100%)</td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

Teeth extraction is considered surgical operation which is as other operations may be associated with bleeding, pain, swelling and delayed healing. The PRF is considered one of new modalities in decreasing post-extraction complications and decreasing healing time [13]. PRF contains platelets and growth factors which increase bone regeneration and enhance wound healing. Also, it contains cytokines like IL-6, TNF-α and VEGF that have important roles in angiogenesis, reduced local inflammatory response and cicatrization [14,15].

In current study, we evaluated the role of PRF on decreasing haemostatic time following extraction surgery with a significant value. A study by [16] indicated that PRF used in post oral and maxillofacial surgical processes revealed rapid healing and decreased haemostatic time by a half as compared to physiologic healing. PRF is a healing biomaterial with a great potential for bone and soft tissue regeneration [17]. Statistical analysis used in current study revealed no significant decrease in post extraction infection between groups. Similarly, [10] observed non-significant difference PRF-treated and control groups regarding infected or inflamed sockets and soft tissue healing. In contrast, [18] reported an increased improvement of soft tissue healing in the experimental group compared with control group. The increased tissue healing by using PRF after teeth extraction also reported by [19]. The main causative factors could be that the field of extraction operation was not fully sterilized, some patients had neglected oral hygiene and do not follow the instructions of the dentist. According to healing time, which was evaluated after one week of teeth extraction, the results of current study showed statistically significant differences between the two study groups. Moreover, [20] illustrated that using PRF made the healing of socket more effective and faster as compared with controls.

CONCLUSIONS

PRF is a new modality used in dentistry for effective decreasing of bleeding time and rapid healing time after teeth extraction.

Ethical Clearance: Obtained from the Research Ethics Committee at Tikrit Teaching Hospital and Ministry of Health, Iraq.

Source of Funding: Self-funded.

REFERENCES


10- Al-Hamed FS, Tawfik, MA, and Abdelfadil E. Clinical effects of platelet-rich fibrin (PRF) following surgical extraction of lower third molar. The Saudi Journal for Dental Research 2017; 8:


Programmed Cell Death Protein-1 (PD-1) Gene Polymorphism and Lung Cancer

Mayasa Abdulla Ali1, Najat Sadeq Hasan2, Qasim S. Al-Mayah2

1Medical Laboratory Techniques/ Al-Rasheed University College/ Iraq, 2Medical Research Unit/ College of Medicine/ Al-Nahrain University/ Iraq

ABSTRACT

Background: Lung cancer is ranked first as a cause of cancer-related mortality worldwide. Programmed cell death protein-1 (PD-1), a type 1 transmembranous receptor It is expressed on activated lymphocytes, natural killer (NK) cells and monocytes. Overexpression of PD-1 gene and high production of the corresponding protein is always parallel with increased PD-1 shedding into soluble form (sPD-1) in the plasma. Measurement of sPD-1 could be useful tool for predicting the activity of PD-1 gene.

Method: This case-control study included a total of 72 patients with histopathologically confirmed LCa and other 60 family-unrelated and age-matched healthy subjects as controls. DNA was extracted from peripheral blood, and the PD-1 gene fragment corresponding to the -538 G/A SNP was amplified with specific primers using conventional polymerase chain reaction. immunosorbent assay.

Results: The frequencies of AA, GA and GG genotypes of -538 G/A SNP in LCa patients were 19.44%, 52.78% and 27.78%, respectively, compared with 31.67%, 51.67% and 16.67%, respectively, in healthy controls. Logistic regression test revealed a significant association between GG genotypes and LCa (OR= 2.85, 95%CI=1.03-7.92, \(P=0.045\)).

Conclusions: These results suggested the significant role of -538 G/A SNP as a risk factor for LCa in Iraqi population.

Keywords: Lung cancer, Programmed cell death protein-1, Polymorphism, Genotyping, RFLP.

INTRODUCTION

Lung cancer is ranked first as a cause of cancer-related mortality worldwide [1]. According to recent statistics, there are more than 25.9 million cases of bronchus and lung cancer (LCa) causing 1.2 million deaths during the period from 1990-2015 [2]. This unique significance is attributed to the high incidence, aggressive behaviour and lack of major advancement in management strategies [3].

Although smoking is responsible for up to 90% of cases in men and 65% in women [4], a plethora of studies emphasized the decisive role of immune system in fighting this malignancy [5]. For example, researchers noted a significant rise in LCa incidence in HIV-positive patients compared with healthy individuals [6]. The most effective anti-tumor immunity is attributed to cytotoxic T-lymphocyte (CTL, CD8+), which can recognize, infiltrate and eliminate tumor cells, although some of these cells may bypass this immune surveillance [7]. Therefore, any defect in T-cells may increase the individual’s susceptibility to various cancers including LCa.

Programmed cell death protein-1 (PD-1), a type 1 transmembranous receptor, is a member of B7-CD28 family. It is expressed on activated lymphocytes, natural killer (NK) cells and monocytes [8]. Functionally, this protein acts as a checkpoint that inhibits activated T-cells in order to maintain self-tolerance and to avoid immune response-related tissue damage [9]. Binding of PD-1 to its ligands results in inhibition of cellular proliferation and cytokine production by T-cells [10]. High levels of this protein are associated with increased T-cell apoptosis, anergy, and functional exhaustion [11].
PD-1 gene, located on chromosome 2q37.3, is highly polymorphic, and more than 30 SNPs have been recognized in this gene \[12\]. SNPs in the promoter region of the gene may have a particular importance because they are usually associated with an alteration in gene expression. Of these, PD-1-538 G/A was widely investigated and found to be significantly associated with many pathologies such as colonic cancer and rheumatoid arthritis \[13,14\].

Overexpression of PD-1 gene and high production of the corresponding protein is always parallel with increased PD-1 shedding into soluble form (sPD-1) in the plasma. Measurement of sPD-1 could be a useful tool for predicting the activity of PD-1 gene.

Thus, this study was aimed to evaluate the association of PD-1-538 G/A SNP and serum level of sPD-1 in patients with LCa.

**METHOD**

**Study population**

This is a case-control study including 72 patients with LCa (37 males and 23 females) with age range of 35-79 years. They were attending Oncology Clinic at the Teaching Hospital of Baghdad Medical City, Iraq, during the period from October 2016 to February 2017. The inclusion criterion was having positive pathological results for LCa while the exclusion criterion was the presence of other cancers.

Family unrelated, age-matched apparently healthy 60 individuals were selected as the control group. Once written informed consent was provided, the subject’s demographic information including age, smoking, dwelling, diabetes mellitus and first relative family history of lung cancer were obtained.

Blood samples, DNA extraction, Gene amplification and genotyping

A sample of about 5ml of venous blood was collected from each subject and divided into two aliquots; one in EDTA tubes and the other in plain tubes. DNA was extracted from whole blood using a ready commercial kit gSYNCTM DNA Mini Kit Whole Blood Protocol (Genaid/ Taiwan) following manufacturer’s instructions. Serum was separated from plain tubes and kept at -20°C until use.

Two primers were used to amplify the PD-1 gene corresponding to the PD-1.1 polymorphism. These primers were forward: 5’- TTCTAGCCTCGCTTCGGTTA-3’ and reverse R: 5’- CTCAACCCCCACTCCCCATTCT-3’ with an expected fragment length of 552 bp. The PCR was carried out on the ABI 9600 (Hybaid/ England) in a total volume of 25μl including 50ng of genomic DNA, 1.5μl of 10×PCR buffer, 0.3μl of 10mM dNTPs, 0.25μl of 10pmol/μl of each primer, and 1.25U of Taq DNA polymerase (Bioneer/Korea). Cycling parameters were as follows: 94°C for 2min; 35 cycles at 94°C for 30s, 60°C for 45s, and 72°C for 30s; and a final extension step at 72°C for 5 min.

The PCR products were subjected to enzymatic digestion with 5U MspI (New England Biolabs LTD, Beijing, China) according to the manufacturer’s instructions. The genotypes of individuals were identified by length of digested fragments subsequent to 2.5% agarose gel electrophoresis stained by ethidium bromide. Allele discrimination was based on fragment size after digestion which was 227 bp for G allele and 282 bp for A allele.

Serum level of sPD-1

A ready commercial kit (Cusabio/China) was used for measuring serum sPD-1 based on quantitative Sandwich enzyme immunoassay technique. The manufacturer’s protocol was followed precisely. Briefly, the standards were prepared by serial 2-fold dilution. One hundred μL of standards and serum samples were added to the ascertain wells in the microplate, which then covered by adhesive strip and incubated for 2hrs at 37°C. The liquid was then removed and 100μL of biotin antibody were added to each well with an incubation time of 1hr at 3737°C. After liquid aspiration, the microplate was washed 3 times with washing buffer. One hundred μL of HPR-avidin were added to each well with incubation and washing as in the previous step. The TMP-substrate (90μL) was added to each well, and the plate was incubated at 3737°C for 30min. Finally, the stop solution (50μL) was added to each well with a gentle mixing. The optical density was determined within 5min using microplate reader at 450nm.

**Statistical analysis**

All statistical analyses were conducted using Statistical Package for Social Science (SPSS/Chicago/USA) software version 20. A P< 0.05 was accepted as
the level of significance. Continuous variables were expressed as mean± standard deviation (SD) and analyzed with Student t-test. Binomial variables were expressed as numbers and percentages and analyzed with Chi-squared test which was also used for the calculation of genotype deviation from Hardy-Weinberg Equilibrium (HWE). Binary logistic regression was used to calculate odds ratio (OR) and the corresponding 95% confidence intervals (CI) in order to assess the association between PD-1-538 G/A SNP polymorphism with LCa risk.

**RESULTS**

**Demographic Data**

**Table 1 Demographic data of the study population**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Patients n=72</th>
<th>Controls n=60</th>
<th>P-value</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/ years (Mean±SD)</td>
<td>52.41±12.6</td>
<td>49.18±11.5</td>
<td>0.731</td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²) Mean ±SD</td>
<td>27.06±5.8</td>
<td>24.73±6.9</td>
<td>0.224</td>
<td></td>
</tr>
<tr>
<td>Sex (No.(%))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>41(56.94)</td>
<td>36(60)</td>
<td>0.723</td>
<td>1.0(ref)</td>
</tr>
<tr>
<td>Female</td>
<td>31(43.06)</td>
<td>24(40)</td>
<td></td>
<td>1.13(0.57-2.28)</td>
</tr>
<tr>
<td>Smoking (No.(%))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>30 (41.17)</td>
<td>33(55)</td>
<td>0.127</td>
<td>1.0(ref)</td>
</tr>
<tr>
<td>Ex/current</td>
<td>42 (58.83)</td>
<td>27(45)</td>
<td></td>
<td>1.71(0.86-3.42)</td>
</tr>
<tr>
<td>Family History (No.(%))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>65(90.28)</td>
<td>58(96.67)</td>
<td>0.053</td>
<td>(Reference)</td>
</tr>
<tr>
<td>Yes</td>
<td>7(9.72)</td>
<td>2(3.33)</td>
<td></td>
<td>6.35 (0.76-53.19)</td>
</tr>
<tr>
<td>Diabetes (No.(%))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>59(81.94%)</td>
<td>43(71.67%)</td>
<td>0.161</td>
<td>1.0(ref)</td>
</tr>
<tr>
<td>Yes</td>
<td>13(18.06%)</td>
<td>7(11.67%)</td>
<td></td>
<td>0.56(0.25-1.29)</td>
</tr>
</tbody>
</table>

OR: odds ratio, CI: confidence interval, BMI: body mass index

**Association of PD-1.1 polymorphism with the incidence of Lung Cancer**

Based on enzymatic digestion pattern visualized in gel electrophoresis (Figure 1), PD-1.1 polymorphism appeared in three genotypes which were AA, AG and GG.

![Figure 1](image.png)
The frequencies of different genotypes and alleles of PD-1-538 G/A polymorphism were shown in Table 2. The GG genotype showed higher frequency in LCa patients (27.78%) than controls (16.67%) with a significant difference (OR=2.85, 95% CI=1.03-7.92, P=0.045). Although G allele had higher frequency in patients than controls (54.17% vs. 42.5%), the difference was slightly above the significance cut-off value (P=0.059).

### Table 2 Genotypes and alleles of PD-1-538 G/A single nucleotide polymorphism

<table>
<thead>
<tr>
<th>rs36084323</th>
<th>Patients n=72</th>
<th>Controls n=60</th>
<th>P-value</th>
<th>OR(95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genotypes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>14(19.44%)</td>
<td>19(31.67%)</td>
<td>0.133</td>
<td>1.0</td>
</tr>
<tr>
<td>AG</td>
<td>38(52.78%)</td>
<td>31(51.67%)</td>
<td>0.26</td>
<td>1.62(0.7-3.75)</td>
</tr>
<tr>
<td>GG</td>
<td>20(27.78%)</td>
<td>10(16.67%)</td>
<td>0.045</td>
<td>2.85(1.03-7.92)</td>
</tr>
<tr>
<td>HWE</td>
<td>0.593</td>
<td>0.685</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alleles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allele A</td>
<td>66(45.83%)</td>
<td>69(57.5%)</td>
<td>0.059</td>
<td>1.0</td>
</tr>
<tr>
<td>Allele G</td>
<td>78(54.17%)</td>
<td>51(42.5%)</td>
<td></td>
<td>1.6(0.98-2.61)</td>
</tr>
</tbody>
</table>

**Serum concentration of sPD-1**

Median concentration of sPD-1 in LCa patients was 37pg/ml (range 16-468pg/ml) compared to 62.5pg/ml (range 22-718pg/ml) in controls (Figure 2). Mann Whitney U-test revealed a significant difference between the two groups (P=0.039).

![Figure 2 Median concentrations of sPD-1 in Lung Cancer patients and their healthy controls.](image)

**DISCUSSION**

Current study revealed a significant association between the mutant homozygous genotype (GG) of the PD-1 polymorphism and the incidence of LCa (OR=2.85, 95%CI=1.03-7.92), which implied that individuals carrying this genotype have 2.85-fold increased risk for LCa compared with those carrying AA genotype. These results are partially in accordance with a recent study conducted by Sasaki et al. [15] in which the authors investigated 583 Japanese surgically-removed non-small cell lung cancer (NSCLC) cases for the association of PD-1.1 gene polymorphism with the overall survival of the patients. They found that GG genotype carriers had significantly worse prognosis. However, numerous studies had indicated a non-significant association between this polymorphism and LCa [16,17]. These disparities in the results may reflect variations in sample size, method of genotyping and ethnical variation.

The most reasonable explanation for the significant association between GG genotype and the increased susceptibility to LCa could be referred to the site of this polymorphism in the promoter region of PD-1 gene. It has been shown that this SNP resides in the putative binding site for upstream control element -2 (UCE-2) transcription regulators (GGCCG at positions 610 to 606) on the gene [15]. It seems that the presence of G allele in this position facilitates the binding of RNA polymerase with a subsequent increase in PD-1 protein production. Supporting this assumption is the study of Ishizaki et al. [18] who demonstrated that haplotype with G allele is associated with high promoter activity and with the development of Japanese subacute sclerosing panencephalitis (SSPE).
PD-1 is a protein with 288 amino acids which regulates the balance between stimulatory and inhibitory signals to the immune response. Thus, it is involved in successful protective immune response, maintenance of T-cell homeostasis and self-tolerance \[19\]. Studies showed that overexpression of PD-1 can block the T-cell cycle in G1 phase by downregulation of cycline-dependent kinases (CDKs), the enzymes that regulate cell cycle, mRNA processing, and transcription \[20\]. Therefore, the presence of GG genotype may inhibit the activation and proliferation of T-cells with ultimate decrease in cell-mediated immune response with a greater chance for cancer cell to reproduce and metastasize.

An interesting result of the current study was the significantly lower serum level of sPD-1 in patients compared to controls. Few studies had investigated the sPD-1 in different pathologies \[21-23\]. In patients with NSCLC, it was reported that the high level of sPD-1 during erlotinib treatment was associated with prolonged progression-free survival and overall survival \[21\].

Based on results of gene polymorphism, it is expected that a high level of sPD-1 in LCAs due to increased PD-1 gene expression associated with GG genotype, with subsequent increase in sPD-1 shedding. However, ELISA results indicated the reverse. This low level of sDP-1 in LCa patients can be explained by the increase in the consumption of this soluble protein by the tumor cells. Studies have shown that PD-L1, the most important ligand for PD-1 protein, is prevalently expressed in numerous solid malignancies including LCa \[24,25\]. The main function of this ligand on tumor cells is to inhibit cytotoxic T-lymphocyte (CTL) and to facilitate tumor progression. However, sPD-1 can bind this ligand which may explain its low level in LCa patients.

All in all, these data indicated the importance of GG genotype of PD-1.1 polymorphism as a risk factor for LCa, and the low serum levels of sPD-1 were associated with this malignancy. However, more studies are required for further clarification of this issue.

**Acknowledgement:** The authors wish to thank all staff in medical research unit/ College of Medicine/ Al-Nahrain University for their kind help in molecular analyses.

**Ethical Clearance:** Obtained from the Research Ethics Committee at College of Medicine/ Al-Nahrain University, Baghdad, Iraq.

**Source of Funding:** Self-funded.

**Conflict of Interest:** Nil.

**REFERENCES**


Maximum Bite Force among Iraqi Primary School Children in Mixed dentition

Athraa Hussein Medhat¹, Aseel Haidar M J Al Haidar²

¹Masters Student, ²Assistant Professor, Department of Pedodontics and Preventive Dentistry/ College of Dentistry/ University of Baghdad, Iraq

ABSTRACT

Background: Biting force and the number of occluded teeth can be considered as important determinants of the masticatory performance. Meanwhile, bite force is the result of the coordination between the different components of the masticatory system (muscles, bones and teeth). Its determination had been considered as an important parameter in the diagnosis of the stomatognathic disorders.

Objective: The present study was performed to determine the maximum bite force (MBF) among a group of Iraqi primary school children in relation to a number of variables including, age, gender and nutritional status.

Materials and Method: A cross sectional study was carried out among 400 children (205 boys and 195 girls) aged 8-10 years. Maximum bite force was determined by using bite force sensor and the body mass index was recorded in kg/m². The data were statistically analyzed by descriptive statistics and by using paired t-test and Chi-squared test.

Results: Boys had higher values of maximum biting force than the girls in both age groups, however, a significant difference between genders was found only in the age group 2. Nutritional status variables represented by BMI index were related significantly with bite force.

Conclusion: bite force was affected by factors like age, gender and BMI.

Keywords: Maximum bite force, Erupted permanent teeth, body mass index, primary school children, bite force sensor.

INTRODUCTION

One of the important functions of the stomatognathic system is the chewing action, which can be defined as the ability of teeth to grind food and preparing the resulting small particles to be swallowed and digested easily [1].

An efficient mastication that can be measured by evaluation of bite force can be achieved by the presence of healthy teeth and proper mandibular movements that are regulated by the action of the temporomandibular joints and the neuromuscular system [2]. Therefore, biting force and the number of occluded teeth can be considered as important determinant of the masticatory performance [3,4]. Meanwhile, bite force is the result of the coordination between the different components of the masticatory system (muscles, bones and teeth). Its determination had been considered as an important parameter in the diagnosis of the stomatognathic disorders [5].

Chewing and digestion can affect the nutrition of children, which is important for their growth and development. So, any difficulties or impairment in chewing may lead to alteration in food preference, shifting toward soft and smooth food that eventually may result in insufficient intake of food which can increase the risk of exposure to diseases related to malnutrition [6] and teeth decay [7].

Foods with harder and more fibrous consistency have a positive influence on the development of stomatognathic structures such as masticatory muscles,
periodontal supporting tissues and the maintenance of bone integrity. On the other hand, foods with soft consistency may have an atrophic effect on the bones and muscles, contributing to the appearance of malocclusion and loss of muscle force [8,9,11,12].

Many studies had investigated the relation between the occlusion forces and body mass index (BMI) [13-15]. Some of them showed a positive correlation between bite force and BMI [10].

In the present setting, no relevant study is available regarding maximum bite force in relation to the number of erupted permanent teeth and nutritional status among school-aged children in Iraq. Hence, this study was conducted to assess the impact of oral and nutritional status on the maximum bite forces in children.

MATERIALS AND METHOD

This cross-sectional study was conducted among a sample of primary school children in Diyala, Iraq after getting the approval from the Ethical and the Scientific Committee of the Pedodontics and Preventive Dentistry Department/ College of Dentistry/ Baghdad University, Iraq. Examination started at the beginning of January 2018 until the end of May 2018. Official permission was obtained from the General Directorate of Education of Diyala Governorate to conduct the study without obstacles. Aims of this study were explained to the school authority to obtain cooperation as much as possible and that was done by a formal document. Prior to including any child in the study, the aims and the nature of the study were explained to the parents and a signed consent was obtained from them containing all the needed information including child’s general health and their acceptance for the inclusion of their children in current study. The inclusion criteria for this study were: 1. Iraqi children aged (8-10) years (the date of birth was checked from the school records), 2. Healthy children with no history of any systemic disease or a history of any present use of medications, 3. Molar relationship of class I angle classification without any open bite or cross bite, 4. No history of TMJ problems (like clicking or crepitus, tenderness, muscle or jaw pain or discomfort during mandibular movements, during talking or eating) or history of bruxism or clenching, and 5. No history of previous orthodontic treatment and/or orthognathic surgery. No evidence of gingival, periodontal disease or teeth mobility.

The exclusion criteria were: 1. Children who showed uncooperative behavior, 2. Children with facial asymmetry or those with cleft lip and/or palate, 3. Children with fractured centrals, large carious lesions or presence of large restorations, congenital defects or deformed teeth, and 4. Children who had any prosthetic device.

Four hundred cooperative children, who met the inclusion criteria and returned a signed consent from their parents, were selected for this study. They were divided into two groups according to their age; Group 1 (their age ranged from 96-107 months) and Group 2 (their age ranged from 108-120 months). Data collection consisted of two main parts: 1. General information: including child’s name, age, gender, date of birth and body height and weight. 2. Oral examination which included the measurement of the maximum bite force (MBF).

Biting force was measured in the anterior area as well as bilaterally in the molars region using a portable occlusal force gauge sensor (Loadstar sensor company, USA; Figure 1) where the teeth were at maximal intercuspation according to a standard procedure [16]. Biting force was measured alternately on the anterior and posterior areas (right and left sides at the first permanent molar region) with 10 seconds resting time after each bite. Children were instructed to bite three times as hard as possible on the gauge sensor without moving the head. The highest value of the three biting force measurements per side was recorded as the MBF for that side. The measurement was done while the child was seated, looking forward, and in upright position as shown in Figure (2).

STATISTICAL ANALYSIS

Data were coded, organized and entered using Microsoft Excel 2010 program, and then exported to the Statistical Package for Social Sciences (SPSS, version 21.0) to perform the statistical analysis. Descriptive statistics were obtained. Kolmogorov Smirnov analysis was used to verify the normality of the data set. Multiple contingency tables were conducted and appropriate statistical tests were performed while Chi-squared test was used for the categorical variables. Independent t-test was used to detect the mean differences. Regression analysis was used to detect the effect of maximum bite force. Pearson’s correlation was used to measure the
relationships between the different variables of the study and the maximum bite force. Level of significance (p value) was at $P \leq 0.05$.  

RESULTS  

Distribution of the study sample was shown in Table (1), which showed that 400 participants were included in current study of whom 205 (51.25%) were boys and 195 (48.75%) were girls.

Table 1 Distribution of the study sample by age and gender

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Boys (No.)</th>
<th>Girls (No.)</th>
<th>Total (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.(%)</td>
<td>No.(%)</td>
<td>No.(%)</td>
</tr>
<tr>
<td>Group 1</td>
<td>80(45.2)</td>
<td>97(54.80)</td>
<td>177(44.25)</td>
</tr>
<tr>
<td>Group 2</td>
<td>125(56.05)</td>
<td>98(43.98)</td>
<td>223(55.75)</td>
</tr>
<tr>
<td>Total</td>
<td>205(51.25)</td>
<td>195(48.75)</td>
<td>400(100.00)</td>
</tr>
</tbody>
</table>

Comparison of maximum bite force of primary school children by age and gender (Table 2) showed that, within the age Group 1, although the average maximum bite force of boys was larger than that of girls (106.4±34.6 and 104.3±31, respectively), the difference was not statistically significant. However, the difference between boys and girls concerning the average maximum bite force was statistically significant among the age Group 2 ($p=0.01$). Also, there was significant difference between genders in regard to the bite force on the right side, left side and on the anterior area among both age groups.

Table 2 Comparison of MBF on the left side, on the right side and on the anterior area between boys and girls according to their age groups*

<table>
<thead>
<tr>
<th>Age group</th>
<th>No.</th>
<th>MBF(R)</th>
<th>MBF(L)</th>
<th>MBF(A)</th>
<th>MBF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys (n=80)</td>
<td>129±61.4</td>
<td>110.5±49.6</td>
<td>79.2±35.8</td>
<td>106.4±34.6</td>
<td></td>
</tr>
<tr>
<td>Girls (n=97)</td>
<td>114.5±57.1</td>
<td>121.7±56.8</td>
<td>76.5±28.9</td>
<td>104.3±31</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>0.1 NS</td>
<td>0.1 NS</td>
<td>0.5 NS</td>
<td>0.6 NS</td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys (n=125)</td>
<td>134.4±70</td>
<td>120.9±57</td>
<td>96.21±32.7</td>
<td>117.2±3</td>
<td></td>
</tr>
<tr>
<td>Girls (n=98)</td>
<td>121.6±62.8</td>
<td>115.5±67.2</td>
<td>83.65±29.07</td>
<td>106.8±3</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>0.5 NS</td>
<td>0.4 NS</td>
<td>0.003 **</td>
<td>0.01 **</td>
<td></td>
</tr>
</tbody>
</table>

*Data are presented as mean and standard deviation. MBF (R) = Maximum bite force in the right side. MBF (L) = Maximum bite force in the left side. MBF(A) = Maximum bite force in the anterior area. MBF = average maximum bite force NS = Nonsignificant difference. ** = Significant ($P \leq 0.05$).
The study results revealed that there was a statistically significant difference between the maximum bite force (on the right side, left side, the anterior area and the average) and the BMI-age (Z) groups of the primary school children. The average maximum bite force was the lowest among the thinness group, while the obese group had the highest values.

### Table 3: Distribution of children’s variables according to BMI-age groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Thinness Mean±SD</th>
<th>Normal Mean±SD</th>
<th>Overweight Mean±SD</th>
<th>Obese Mean±SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBF(R)</td>
<td>115.6±56.6</td>
<td>121.8±60.6</td>
<td>131.3±73.9</td>
<td>148±77.2</td>
<td>0.07 NS</td>
</tr>
<tr>
<td>MBF(L)</td>
<td>108±37.7</td>
<td>117.5±60.8</td>
<td>110.3±51</td>
<td>133±53.3</td>
<td>0.2 NS</td>
</tr>
<tr>
<td>MBF(A)</td>
<td>78.5±31.3</td>
<td>82.8±32</td>
<td>95.9±36.6</td>
<td>90.132.4</td>
<td>0.03 S</td>
</tr>
<tr>
<td>Average MBF</td>
<td>100.7±16</td>
<td>107.4±17.5</td>
<td>112.5±14.5</td>
<td>123.7±24.6</td>
<td>0.05 S</td>
</tr>
</tbody>
</table>

MBF (R) = Maximum bite force in the right side. MBF (L) = Maximum bite force in the left side. MBF (A) = Maximum bite force in the anterior area. MBF= average maximum bite force, S= Significant P ≤ 0.05.

### DISCUSSION

Measuring bite force among children in precise manner is difficult because it is influenced by many interrelated factors such as type of occlusion, presence of dental caries and diseases, the intermaxillary space and intercuspation of the occlusal surfaces of teeth. Furthermore, the accuracy of the measuring apparatus itself can affect the values of the biting force directly [17,18].

In accordance with previous studies that were done among younger children, maximum bite force increases with age [19-22]. However, Braun et al. [13] reported that MOBF was not correlated well with age. Their results could be related to the age of the sample, which was consisted of adults (their ages ranged from 26-41 years).

When comparing the bite force of both genders among the different age groups (Table 2), it was found that the average bite force was higher among boys compared to girls in both age groups. However, the difference was significant only within age group 2, where the average maximum bite force for boys was 117.2±3 while for girls it was 106.8±3. Biting force was measured in the anterior area and on both sides (three times for each) and the higher value was chosen (from the three readings) to increase the accuracy of the measurement. This finding was in agreement with several previous studies which reported that MBF was higher in boys than in girls [18,23-28]. On the other hand, the result of this study was in disagreement with some previous studies which reported that no gender difference was found in relation to MBF measurements [10,19]. Differences between these studies could be attributed to sample size and the device used for measuring the MBF.

The thinness group had the lowest value of the average maximum bite force whereas the obese group had the highest values (Table 3). These results were in accordance with those of Rentes et al. [30] and Owais et al. [18] who concluded that the body variables (height and weight) had a small influence on the biting force. On the other hand, Su et al. [31] reported that height and weight had no effect on the MBF in children.

On average, MBF for boys was higher than that found for girls with significant difference among the age group 2, MBF increased with age, and Age, gender and nutritional status are predictors that can affect the values of the MBF.

**Ethical Clearance:** Obtained from the Ethical and the Scientific Committee of the Pedodontics and Preventive Dentistry Department/ College of Dentistry/ Baghdad University, Iraq. Also, official permission was obtained from the General Directorate of Education of Diyala Governorate, Iraq.

Source of Funding: Self-funded.
Conflict of Interest: Nil.

REFERENCES

22. Usui T, Uematsu S, Kanegae H, Morimoto T, Kurihara S. Changes in maximum occlusal


Relationship between BMI and Risk Factors for Breast Cancer

Sahar A. Ahmed¹, Hameed H. Ali², Basima S. Ahmed³
¹Department of chemistry/ College of Education for girls/University of Anbar, Ramadi, Iraq, ²Department of chemistry/ College of Science/ University of Anbar, Ramadi, Iraq, ³Department of Clinical Biochemistry/ College of Pharmacy/ University of Sulaimani, Sulaimani, Iraq

ABSTRACT

Background: Breast cancer is the commonest cancer affecting women worldwide. Different studies have dealt with the etiological factors of that cancer aiming to find a way for early diagnosis. The present study investigated the relationship between BMI and evaluation of some etiological risk factors among breast cancer patients in Iraq.

Methods: This investigation was carried out on 74 patients (all were females) who received satisfactory therapy. They were confirmed for breast cancer by histopathological examinations at Nanakali Hospital in Erbil, Iraq, and 30 of apparently healthy women were used as a controls. All women (patients and controls) were between 20-72 years. Age, weight, height, hormone receptors (ER, PR and Her2) were taken into account as risk factors.

Results: Among the breast cancer patients, 45% were pre-menopausal, 28% were menopausal and 27% were post-menopausal. Body mass index (BMI) is widely used as a measure of obesity. We investigated the relationship between obesity (BMI >= 30 kg/m²) and outcomes in women with ER-positive early stage breast cancer.

Women with high BMI presented with more aggressive stage at the time of diagnosis. Their tumors usually show positive hormonal status as ER/PR), HR+/HER2 have being the most predominant molecular subtypes. Therefore, decreasing weight will mainly contribute to decrease tumor exposure to high endogenous estrogen especially in postmenopausal age, dramatically effect response to treatment in return.

Keywords: Breast cancer, estrogen, BMI, Obesity, hormonal receptors.

INTRODUCTION

Breast cancer is the commonest malignancy found in women in Europe and the United States, and the incidence continues to rise slowly [1]. Breast cancer is the most common cancer among women in Arab countries with a younger age of around 50 years at presentation. Locally advanced disease is very common and total mastectomy is the most commonly performed surgery [2]. In Iraq, breast cancer is the commonest type of female malignancy accounting for approximately one-third of the registered female cancers according to the latest Iraqi Cancer Registry. This shows that the breast is the leading cancer site among the Iraqi population in general, surpassing even bronchogenic cancer [3].

Worldwide, at least 2.8 million people die each year as a result of being overweight or obese, and an estimated 35.8 million (2.3%) of global Disability–Adjusted Life Years (DALYs) are caused by overweight or obesity. Overweight and obesity lead to adverse metabolic effects on blood pressure, cholesterol, triglycerides and insulin resistance. Risks of coronary heart disease, ischemic stroke and type 2 diabetes mellitus increase steadily with increasing body mass index (BMI), a measure of weight relative to height. Raised body mass index also increases the risk of breast cancer, colon, prostate, endometrium, kidney and gall bladder [4]. It was shown from previous studies that obesity is associated with the incidence of breast cancer [5-7]. Overweight patients with breast cancer often have higher mortality rates than patients with normal weight. In addition, obesity is a poor prognostic
factor in breast cancer\cite{8-10}. At present, BMI is applied to measure whether a person is obese or not. Both the weight and the height of the body are considered in BMI, which reflects the relationship between body mass and height. BMI is easy to measure, and it is currently the standard index used internationally to measure the extent of obesity and to evaluate the overall fitness.

The aim of current study was to explore the possible association between BMI and breast cancer in female patients.

**MATERIALS AND METHOD**

**Patients**

This study was a retrospective-prospective study, carried out at Nanakali hematology/oncology hospital of Erbil on a sample of 74 females who were diagnosed with breast cancer (stage II and stage III).

A questionnaire was used for collection of demographic data such as age, weight, height, body mass index and clinico-pathological assessment (such as TNM staging, histology grade, ER/PR and HER2 status).

**Body mass index (BMI)**

BMI was calculated as weight in kilograms divided by height in meters squared and rounded to the nearest tenth, according to the following equation\cite{11}:

Following current recommendations, normal weight was defined as a BMI of 18.5-24.9, overweight as a BMI of 25.0 to 29.9 and obesity as a BMI of 30.0 or higher\cite{12}.

**Data analysis**

The relationship of BMI to the stage of breast cancer at diagnosis was evaluated using the $x^2$-test for frequency tables of BMI by stage of breast cancer. The Pearson correlation test was used to determine any association between BMI and age.

**RESULTS AND DISCUSSION**

A total of 74 breast cancer patients (age range = 20–72 years) were included in the present study (Table 1 & Figure 1).

<table>
<thead>
<tr>
<th>Age group</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>30-39</td>
<td>14</td>
<td>18.9</td>
</tr>
<tr>
<td>40-49</td>
<td>26</td>
<td>35.1</td>
</tr>
<tr>
<td>50-59</td>
<td>21</td>
<td>28.4</td>
</tr>
<tr>
<td>60 &gt;=</td>
<td>11</td>
<td>14.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>74</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

**Table 1 Distribution of participants according to their age groups**

We classified them into three age groups:

Premenstrual women less than 45 years of age (45% of patients)

Menstrual women between 45-50 years of age (28% of the patients).

Postmenopausal those older than 50 years of age (27% of the patients) (Table 2 & Figure 2).

<table>
<thead>
<tr>
<th>Menopausal status</th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premenopausal</td>
<td>33</td>
<td>45</td>
</tr>
<tr>
<td>Menopausal</td>
<td>21</td>
<td>28</td>
</tr>
<tr>
<td>Postmenopausal</td>
<td>20</td>
<td>27</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>74</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Table 2 Distribution of breast cancer patients according to menopause**
(81%) of our breast cancer patients had positive ER, (82%) of breast cancer patients had positive PR. About one third (38%) of our breast cancer patients had positive HER2 and 62% of them had negative HER2. These findings are shown in Table 3.

Table 3 Distribution of breast cancer patients according to ER, PR and HER2 receptors

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>60</td>
<td>81</td>
</tr>
<tr>
<td>Negative</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>100</td>
</tr>
<tr>
<td>PR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>61</td>
<td>82</td>
</tr>
<tr>
<td>Negative</td>
<td>13</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>100</td>
</tr>
<tr>
<td>HER2/neu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>28</td>
<td>38</td>
</tr>
<tr>
<td>Negative</td>
<td>46</td>
<td>62</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>100</td>
</tr>
</tbody>
</table>

Breast cancer women in the present study with positive ER were the prevalent (81%). 82% of breast cancer women had positive PR, while patients with positive HER2 represented only 38% of the patients. These findings were similar to those reported by previous studies conducted in Iraq and Turkey [13,14].

Regarding the stage of breast cancer, 66.2% and 33.8% of participants presented with stage II and stage III, respectively (Table 4), according to the TNM staging system.

Table 4 TNM Staging of Breast Cancer Patients

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>49</td>
<td>66.2</td>
</tr>
<tr>
<td>III</td>
<td>25</td>
<td>33.8</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>100</td>
</tr>
</tbody>
</table>

Relationship between body mass index (BMI) and breast cancer.

Moreover, our participants were classified according to BMI into three groups as follows:

1. Normal weight: 9.4%.
2. Overweight: 36.4%.
3. Obese: 54.2%.

The mean BMI of the studied breast cancer patients was 32.9 Kg/m² (Table 5).

Table 5 Distribution of breast cancer patients according to their BMI

<table>
<thead>
<tr>
<th>BMI</th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>7</td>
<td>9.4</td>
</tr>
<tr>
<td>Overweight</td>
<td>27</td>
<td>36.4</td>
</tr>
<tr>
<td>Obese</td>
<td>40</td>
<td>54.2</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>100</td>
</tr>
</tbody>
</table>

There was a significant association between obesity and breast cancer patients with positive ER (p=0.05; Table 6) by using chi-squared test. A significant association was observed between obesity among breast cancer patients and positive PR (p<0.05; Table 6).
Table 6 Distribution of ER, PR and HER2 receptors according to patients’ BMI

<table>
<thead>
<tr>
<th>Hormonal receptors</th>
<th>BMI</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NORMAL</td>
<td>OVERWEIGHT</td>
<td>OBESE</td>
</tr>
<tr>
<td>ER</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Positive</td>
<td>3</td>
<td>43</td>
<td>24</td>
</tr>
<tr>
<td>Negative</td>
<td>4</td>
<td>57</td>
<td>3</td>
</tr>
<tr>
<td>PR</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Positive</td>
<td>5</td>
<td>71</td>
<td>23</td>
</tr>
<tr>
<td>Negative</td>
<td>2</td>
<td>29</td>
<td>4</td>
</tr>
<tr>
<td>Her2/neu</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Positive</td>
<td>3</td>
<td>43</td>
<td>10</td>
</tr>
<tr>
<td>Negative</td>
<td>4</td>
<td>57</td>
<td>17</td>
</tr>
</tbody>
</table>

There was a significant association between breast cancer patients with positive ER and obesity (p=0.05; Table 6) and a significant association was also observed between breast cancer women with positive PR and obesity. These findings were consistent with the results reported by Peng Xing et al. [15].

Moreover, there was significant association between BMI categories and breast cancer patients regarding stage of tumor (Nottingham Grading System) (P<0.05; Table 7).

Table 7 Patients’ breast cancer stage according to their BMI

<table>
<thead>
<tr>
<th>Variable</th>
<th>BMI</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NORMAL</td>
<td>OVERWEIGHT</td>
<td>OBESE</td>
</tr>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Nottingham Grading System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage II</td>
<td>4</td>
<td>57</td>
<td>20</td>
</tr>
<tr>
<td>Stage III</td>
<td>3</td>
<td>43</td>
<td>7</td>
</tr>
</tbody>
</table>
Results of current study revealed that breast cancer with TNM stage II and III were significantly associated with obesity (P≤0.05; Table 1). This finding agreed with that reported in a study done by \[16,17\] who suggested that higher body mass index was associated with advanced stages of breast cancer. There may be several reasons for the observed association between body mass and stage of breast cancer at diagnosis. First, it could be due to a delay in diagnosis among obese women. Overweight/obese women have larger breasts, and thus tumor detection may be more difficult in these women simply because tumors are more difficult to palpate in larger breasts. This hypothesis is supported by several studies that show a positive relationship between breast size and stage of breast cancer \[18\]. Second, obesity is associated with advanced breast cancer at diagnosis, high tumor proliferation rates, and more triple-negative phenotypes, indicating that it may adversely contribute to prognosis \[19\]. Some studies suggested that locally increased estrogen levels promote tumor growth \[20\]. Obesity causes an increased production of the estrogen known as estrone via the aromatization of androstenedione in peripheral adipose tissue. In addition, obesity is associated with low levels of sex hormone-binding globulin which results in a significantly higher level of the biologically active unbound form of estrogen known as estradiol \[15\]. Therefore, it is possible that obesity leads to an overall increase in the active levels of estrone and estradiol which in turn promote the growth of breast tumors in obese women.

Moreover, current study showed significant association between obesity and hormonal receptor subtype ER+/PR+ (P≤0.001; Table 8).

### Table 8: Distribution of ER/PR receptors according to BMI in breast cancer patients

<table>
<thead>
<tr>
<th>BMI</th>
<th>ER/PR receptors</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ER &amp; PR+ve</td>
<td>ER+ve/PR-ve</td>
<td>ER-ve/PR+ve</td>
</tr>
<tr>
<td></td>
<td>N0.</td>
<td>%</td>
<td>N0.</td>
</tr>
<tr>
<td>Normal</td>
<td>3</td>
<td>0.5</td>
<td>7</td>
</tr>
<tr>
<td>Overweight</td>
<td>23</td>
<td>42.0</td>
<td>3</td>
</tr>
<tr>
<td>Obese</td>
<td>29</td>
<td>57.5</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100</td>
<td>15</td>
</tr>
</tbody>
</table>

There is strong association between high BMI and ER+/PR+ hormone receptor subtypes in our study (P≤0.001; Table 8). These results are somewhat similar to results of 9 cohorts and 22 case-control studies comparing the highest versus the reference categories of relative body weight showed that the risk for ER+PR+ tumors was 20% (lower) (95% CI = −30% to −8%) among premenopausal (2,643 cases) and 82% (higher) (95% CI = 55–114%) among postmenopausal (5,469 cases) women \[21\]. Current study found a significant association between obese postmenopausal breast cancer patients and HR+/Her- subtype (P≤0.001) and this finding was more significant in postmenopausal obese women (P≤0.001; Table 9). This finding agreed with that reported in a study carried in Iraq \[22\].

Obesity has been recognized as a significant risk factor of breast cancer among postmenopausal women and is associated with poor prognosis. This result was in agreement with the results of another study that showed that patients with high BMI are most clearly associated with hormonal receptor–positive tumors and suggest that triple-negative tumors may have distinct etiology \[23,24\].

This result disagrees with \[25\] who stated that triple negative tumors were equally common in black women diagnosed before and after age of 50 (31% vs 29%), respectively, and who were obese and non-obese (29% vs 31%), respectively. Considering all patients, as BMI increased, the proportion of triple negative tumors decreased (P≤0.08) \[25\]. Body mass index (BMI)
is widely used as a measure of obesity. Dignam et al. [26] investigated the relationship between obesity (BMI $\geq 30.0$ kg/m²) and outcomes in women with lymph node-negative, ER+ve early stage breast cancer. They found that obese women as compared with normal weight women had greater all-cause mortality [26]. Obesity also has an adverse prognostic effect in women with lymph node-negative and ER-ve breast cancer. However, this prognostic effect has not been consistent and may be influenced by several factors such as menopausal status, extent of disease, and receptors status [27, 28].

**Ethical Clearance:** Obtained from the Research Ethics from Nanakali Hospital in Erbil, Iraq.

**Source of Funding:** Self-funded.

**Conflict of Interest:** Nil.

**REFERENCES**

1. International Agency for Research on Cancer: Globocan. Lyon, France; 2012..


17. Cui Y, Whiteman MK, Flaws JA, Langenberg P, Tkaczuk KH, Bush TL. Body mass and stage of...


22. AL- Safi AMH, Yassin BAG, AL- Tameemi EA. Body mass index among women with proved or suspected breast cancer attending national center for early detection. Medical City Campus. IOSR Journal of Dental and Medical Sciences 2015; 14(5): 53-59.


Study the Effect of Chemotherapy on Some Hematological and Biochemical Parameters of Cancer Patients in AL-Muthanna Province, Iraq

Hanaa Ali Aziz¹, Jabbar Mhawes Habeeb²

¹College of Sciences/ Al-Muthanna University, Iraq, ²Al-Husain Teaching Hospital/ Al-Muthanna Governorate, Iraq

ABSTRACT

Background: The aim of this study was evaluated the effect of chemotherapy on some hematological and biochemical parameter of cancer patient, during the period from October-2017 up to March–2018. Fifty sample were examined in the present study, their ages ranged between 30-80 years old. The samples were examined by using hematological and biochemical tests. The study indicated a significant decrease at (P<0.05) in red blood cells (RBC), hemoglobin (HB) and white blood cells (WBC) of patients receiving treatment compared with patients not treated. The study showed a significant decrease at (P<0.05) in Urea and Creatinine of patients receiving treatment compared with patients not treated.

Keyword: chemotherapy, Hematological, Biochemical, cancer, Iraq.

INTRODUCTION

Cancer is a term used for diseases in which abnormal cells divide without control and may invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph. When an error occurs in the formation of a new cell, that cell can become cancerous cell. In addition to an error in development of cancer cells, they do not have the internal system that causes the cell to die after certain time. This causes buildup of abnormal cells which can form a mass of tissue, called tumor, or it can crowd out the good healthy cells, such as leukemia cells or other cancers that affect the blood. If cancer cells leave their original site and move to other parts of the body, this is called metastasis.

Chemotherapy is one of the principal modes of cancer treatment. It was first used to treat advanced lymphoma in the late 1940s, after that it has been known that the use of mustard gas in the World War I caused leukopenia. Cancer treatment is targeted at its proliferation potential and its ability to metastasis; hence, the majority of chemotherapy drugs take advantage of the fact that cancer cells divide rapidly. Chemotherapy is able to kill most of the susceptible tumorous cells succeeding to send cancer into remission for weeks or months after which it reemerges as a more aggressive disease. Anticancer chemotherapy currently involves the use of drugs (cytostatic or cytotoxic agents) that prevent proliferation of tumor cells and/or cause their destruction, taking advantage of the characteristically shortened cell cycle of these cells. The main problem posed by such treatment is lack of selectivity of most antineoplastic drug substances. The latter also act upon normal cells with an accelerated cell cycle, such as bone marrow cells, hair follicle cells and the epithelial cells of the gastrointestinal tract. Some of the most frequent side effects of chemotherapy are bone marrow suppression resulting in leukopenia (observable in peripheral blood towards day 10 after the start of chemotherapy), thrombocytopenia (after 10-14 days) and anemia (less frequent and slowly developing). Other common effects are nausea and vomiting, hair loss (alopecia), and hand-foot syndrome (clinically characterized by painful, symmetrical erythema of the palms and soles often preceded by parenthesis in the...
affected zones)\textsuperscript{[12]}. Most of the side effects gradually disappear after the end of treatment, though in some cases permanent effects may be observed such as cardiac (myocardiopathy), pulmonary (fibrosis), renal (chronic renal failure) or reproductive level (sterility)\textsuperscript{[13]}.

Cancer or malignant neoplasm is a genetic disorder that results from genetic or epigenetic alterations in the somatic cells\textsuperscript{[14]}. Previous studies showed that tumor genesis in humans is a multistep process which involves various genetic or epigenetic changes which ultimately drive the malignant transformation of the normal cells\textsuperscript{[15]}. Mutations required for the malignancy can be acquired gradually step by step during various stages of an individual’s lifetime. A part from the acquired ones, some mutations have hereditary origins and; hence, are involved in a hereditary form of malignancy such as the familial form of retinoblastoma. Mutations in the cellular proto-onco genes, involved in growth, and tumor suppressor genes are frequently associated with cancer and are considered to be the obvious genetic targets for mutations\textsuperscript{[16]}. Various types of cancers causing genetic aberrations are well characterized such as mutations, gene amplification, translocation, structural deletion, chromosomal miss-segregation etc\textsuperscript{[17]}. Cancer is caused by both internal factors (such as inherited mutations, hormones, and immune conditions) and environmental/acquired factors (such as tobacco, diet, radiation, and infectious organisms\textsuperscript{[18]}. Breast carcinoma is the most common malignancy and leading cause of death in women worldwide\textsuperscript{[19]}. Breast cancer is heterogeneous in its clinical, genetic and biochemical profile\textsuperscript{[20]}. Multiple Myeloma is a cancer of plasma cells which are a type of white blood cell. Multiple Myeloma is known by a few different names Myelomatosis, plasma cell myeloma and also Kahler’s disease\textsuperscript{[21]}. Plasma cells are part of the body’s immune system, They play the role of making antibodies to fight off infections\textsuperscript{[4]}. This cancer makes the plasma cells start growing out of control. Multiple Myeloma is the "second most common hematological malignancies and represents 1% of all malignant diseases\textsuperscript{[22]}.

**MATERIALS AND METHOD**

Fifty samples of blood were obtained from patients with cancer who participated in present study. All participants undergone complete hematological and biochemical tests before and after taking chemotherapy. Their ages ranged from 30 to 80 years. The study was conducted during the period from October 2017 to March 2018. These patients were registered as cancer patients in the Oncology Unit at Al-Hussein Teaching Hospital in Al-Muthanna Province.

Five ml of venous blood were collected from each person and the collected blood was divided into EDTA polypropylene tube (3ml) that preserved in refrigerator at -20°C and in serum tubes (2ml). The blood in the EDTA tubes was used to perform Complete blood counts (CBC) while the blood in the serum tubes was centrifuged to separate the serum which was preserved in new plastic screw tip tubes and used to determine the biochemical parameters.

**Hematological Parameters**

A complete system of reagents of control and calibrator, (Sysmax-Kx-21) was used to determine complete blood count (CBC) of participants and controls that included Red Blood Cells (RBCs) count, White Blood Cells (WBCs) count , Hemoglobin (Hb), Packed Cells Volume (PCV) and Platelets count.

**Biochemical Parameter.**

A complete system of reagents of control and calibrator, (Bio-Autolyzer) was used to determine some biochemical parameter that included urea and creatinine.

**RESULTS AND DISCUSSION**

Effect of cancer chemotherapy on hematological and biochemical parameters

The present study indicated a significant decrease at (P<0.05) in WBCs count of patients receiving anticancer treatment compared with untreated patients. This results may be due to defect in bone marrow production of these cells and may be related to immune system because these cells are concerned with the role of immune response against infection. These results are in agreement with those reported by\textsuperscript{[10]}. In addition, results of current study showed a significant decrease at (P<0.05) in Hb and RBCs of patients receiving treatment compared with untreated patients. These results may be due to the decline in the number of red blood cells\textsuperscript{[10]}. Also, the decrease in hematocrit might be the consequence of erythropoiesis failure, destruction of mature cells and/ or increased plasma volume. Also, the depletion of peripheral blood
elements may be a bone marrow syndrome.\textsuperscript{[23]} Also, two mechanisms were suggested to explain the reduction in hemoglobin concentration due to irradiation. Firstly, blockage of the incorporation of iron into hemoglobin due to disturbance in the biogeneration structure of hemoglobin molecule. Secondly, oxidation of hemoglobin iron causing loss of the biological structure and activity of hemoglobin molecule.\textsuperscript{[13]}

On the other hand, present study indicated a significant increase at (P<0.05) in serum urea and creatinine of patients receiving treatment compared with untreated patients. These results may be due to that creatinine is a waste product that is normally filtered from the blood and excreted with the urine. Lower creatinine and urea levels in cancer patients may be related to disturbance of kidney function and/or low muscular mass.\textsuperscript{[6]}

**REFERENCES**


Genetics of Sickle Cell Anemia Disorders in Baghdad City, Iraq

Eqbal Dohan Chillab¹, Ro’a Ali Talib², Ghaidaa Raheem Lateef Al-Awsi³

¹²Department of Pathological Analyzes, Al-Mustaqbal University College, Hilla, Babylon, Iraq
³Department of Radiology Technologies, Al-Mustaqbal University College, Hilla, Babylon, Iraq

ABSTRACT

The results show that the number of patients in Al-Iskan District surpassed that in Al-Harthiyaa. Moreover, in studying the spread of Malaria disease and its relation to Sickle cell anemia, it has been noticed that patients infected with Malaria were more prone to have sickle cell anemia as reflected in the high level of infected patients in Al-Iskan District. In investigation the relation between the patient’s gender and this type of anemia, the study revealed that the number of male patients was lesser than of females in both Al-Iskan and Al-Harthiyaa District. The study also revealed that majority of patients with sickle cell anemia are with in age group that ranges 11-25 years in Al-Iskan, While the results were different concerning Al-Harthiyaa patients. The age groups that range 1-5 years as well as those 11-15 years are more infected with sickle cell anemia in the latter district.

Keywords: Sickle Cell Anemia, Genetic, Disorders, Iskan, Harthiyah, Baghdad, Iraq

INTRODUCTION

Sickle Cell Anemia is a genetic disease resulting from the exchange of amino acids in the hemoglobin protein, which carries oxygen in the blood, leading to transformation of the natural disk shape of red blood cells into the sickle-like shape [1]. SCD is a group of pathological symptoms affecting hemoglobin when it genetically moves from both parents with SCD or from one parent. In addition, SCD hemoglobin may be genetically transformed due to other hemoglobin diseases leading to different types of SCD [2,3].

SCD is one of the most common genetic hemolytic anemias causing red blood cells to break. It also tends to block the capillaries in the vessels, instead of being compressed in the way through, because the cell shape changes from the normal disk shape to a sickle-like shape. Figure 3 shows pellets in patients with SCD [4,5].

Genetics of S-β Thala

It is a pathological condition that results from the inheritance of SCD gene from one parent and β-thala. gene from the other parent [6]. In the S-BO thala., a failure in the production of the allyline responsible for the production of beta-chain globin and, therefore, the production of normal hemoglobin. Then, SCD hemoglobin production becomes 70-80%, Hb-A2 hemoglobin becomes 3-5% and embryonic hemoglobin production becomes 10-20% [7,8].

In S-β+ thala., a failure to produce one of the two allylines responsible for the production of beta-globin chain and therefore the production of the normal hemoglobin decreases down to 10%-20%, Hb-A2 hemoglobin down to 3-5% and embryonic hemoglobin down to 10-20% [9,10]. Table 1 Shows SCD types with respective hemoglobin ratios.
### Table 1 SCD types with respective hemoglobin ratios (Andreson, 1985)

<table>
<thead>
<tr>
<th>Genetic type</th>
<th>Clinical condition</th>
<th>Hemoglobin ratio</th>
<th>Other observed symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Hb-A</td>
<td>Hb-S</td>
</tr>
<tr>
<td>SA</td>
<td>SCD carrier</td>
<td>55-60%</td>
<td>40-45%</td>
</tr>
<tr>
<td>SS</td>
<td>SCD</td>
<td>-</td>
<td>85-95%</td>
</tr>
<tr>
<td>S-BO</td>
<td>SCD + Mediterranean anemia</td>
<td>-</td>
<td>70-80%</td>
</tr>
<tr>
<td>S-B+</td>
<td>SCD + Mediterranean anemia</td>
<td>10-20%</td>
<td>60-75%</td>
</tr>
<tr>
<td>SC</td>
<td>Hemoglobin C anemia</td>
<td>-</td>
<td>45-50%</td>
</tr>
</tbody>
</table>

Survival mechanism of SCD mutation in the family

In 1955, Lie studied the survival probability of a new genetic mutation susceptible to natural selection when it has high recurrence in the first generation. Then it is reduced due to natural selection which does not work on low recurrence genes having a low recurrence. Therefore, mutation survives in the family and it cannot be disposed, as its survival is due to its occurrence in the carrier genotypes. In addition, SS genotype is normal and ss genotype is recessive and its carrier dies because red blood cells became sickle-shaped. The carrier ss genotype survives normally unless exposed to stress and oxygen deficiency [11].

It was found that the superiority of the genotype in Africa is due to the resistance of this structure to the common fatal malaria leading to the survival of the S gene at high rates in the family [12].

The Genetic relation between SCD and malaria

The relationship between SCD and malaria is an over dominance case [13]. If both beta genes on the short arm of chromosome 11 carry normal allele, the naturally occurring structure (SS), has no electoral advantage against malaria. If one of the genes of beta-globin carries a mutant allele, the genetic makeup (Ss), which is characterized by the appearance of the signs of the spleen on the cells of people with severe oxygen deficiency, has an electoral advantage against malaria. That is, the installation is more resistant than the SS. However, if both beta genes carry a mutant allele, they produce the abnormal genetic makeup (ss) that does not live long after birth unless it is subjected to medical care. This structure does not have an electoral advantage against malaria [14, 15].

Doctor Alison (1943) studied the recurrence of the gene responsible for SCD that is controlled by an autosomal recessive gene and found that the recurrence rate of S gene was 0.95 while the recurrence rate of s gene was 0.05, but he studied the case in Africa and found that the recurrence of S gene was of 0.16 [16].

**MATERIALS AND METHOD**

**Data collection**

This study used recorded data from December 2017 to May 2018 at Iskan and Harthiya towns. The data were collected from the Iskan hospital and from Al-Yarmook hospital for data of Harthiya town. The collected data did not represent the reality of the disease in Iskan and Harthiya towns. However, they may serve as preliminary indicators that can be monitored and expanded in future studies.

**Statistical Analysis**

This study used Chi-squared test and percentages to illustrate SCD prevalence in Iskan and Harthiya towns. Chi-squared was also used to show the statistical significance of the relationship of SCD and the separation of G6PD hydrogen in both towns and gender and age.
relations with SCD. To calculate Chi-squared value, we have:

\[ O = \text{Observed: values from recorded data.} \]

\[ E = \text{Expected: values that were calculated from the following relationship and shown on the assumption of Null Hypothesis, then finding the rest of the expected values from side groups using a 2x2 table (Table 3).} \]

**RESULTS AND DISCUSSION**

**Spread of SCD in Iskan and Harthiya towns**

The results of the diagnosis in Iskan hospital showed that among 80 people who had signs of anemia, 39 were having SCD after taking sickling test and the percentages were calculated as in Table 2.

The results of the recorded data of SCD Harthiya town were 17 patients, 6 of them were from outside the town and the percentages were calculated as well. The results of the Chi-squared calculation reflect a statistically significant difference (p <0.01) as shown in Table 3.

Data from current study showed that SCD spread was significant in Iskan town compared to Harthiya town. It is believed that this is because SCD incidence is higher in dark complexion people than in fair complexion people [9]. It was observed that SCD patients in the United States were predominantly of African origins.

**Malaria spread in Baghdad and its relation to SCD in Iskan town**

Data obtained from present study revealed that malaria infection was more frequent in Iskan town as it is explained in Table 3. The wide spread of SCD and malaria in Iskan town indicated that, as proved in several previous studies, SCD gives relative resistance against malaria as normal persons die from malaria.

It is important to note that the explanation to the co-occurrence of SCD and G6PD enzyme deficiency increases the resistance against malaria [17,18]. Therefore, the relationship between SCD and G6PD enzyme deficiency was measured in the statistics found in Iskan hospital in Iskan town and it was found that among 39 SCD patients, 13 were infected G6PD. When Chi-squared test was performed, it indicated that there was a significant statistical correlation (p <0.05) as shown in Table 4.

These results are consistent with Lamia and Russell PJ. (1999) [14,20] results. They observed that the SCD incidence and G6PD were very high in Door Al-Shuhada town which had malaria spread compared to other Al-Sadr town quarters. SCD infection in Door Al-Shuhada town was 16% and it was 2.5% in the other quarters of Iskan town.

**Gender**

The number of SCD patients in Iskan was 10 (25.6%) males and 29 (74.4%) females out of a total of 39. Chi-squared test showed higher statistical difference of p <0.01 in SCD infection in females than males as shown in Table 5. This finding does not necessarily mean that there is a genetic link with gender.

On the other hand, the data obtained in Harthiya town showed that there were 7 (41.7%) SCD male patients and 10 (58.82%) SCD female’s patients out of 17. Chi-squared test showed a statistically significant difference in the level of female infection (p <0.05) as shown in Table 6. It is useful to carefully consider these results because they are based on a few patient numbers that does not represent the real infection in Harthiya town.

Steinburg (2002), when he tested the effect of gender on SCD patients, he pointed out that male patients were higher in number than females. The reason for this was that females had higher levels of embryonic hemoglobin than males regardless of the individual pattern they possess. So, he suggested that high embryonic hemoglobin in females can be reflected on hormonal factors affecting gene expression of beta-globin gene leading to increased production of embryonic hemoglobin. Therefore, SCD level and severity are lower in females with high levels of embryonic hemoglobin and they are less frequently admitted to hospitals than males.

Due to the discrepancy between the results of this study and those of the other studies, which is due to the limited number of sampled patients in this study, we believe it is useless to focus on gender.

**Age**

Data obtained from Iskan hospital revealed that most SCD patients were 11-25 of age because they show symptoms very obviously when exposed to low oxygen due to increased continuous stress in this range of age. The percentage of different age groups was calculated.
as shown in Table 7. The distribution of values for age groups upon diagnosis was similar to normal distribution. These results were consistent with Lamia & Adil (1997) who found that SCD patient were mostly in the age groups. [22,23] found that SCD diagnosis after puberty was high because of the low production of embryonic hemoglobin with aging, leading to clear SCD symptoms.

Data obtained from the various districts in Harthiya town showed that age groups with most SCD varied. Age groups 1-5 and 11-15 years showed more SCD incidence (Table 8). However, the low number of SCD patients in Harthiya town may not justify commenting on this subject. Distribution of values for age groups upon diagnosis differed from normal as in Figure 7.

**CONCLUSIONS**

Results of current study revealed that SCD is one of the genetic blood diseases and it results from recessive mutation that moves from parents to children and may be associated with other hemoglobin diseases consisting of various SCD types. In addition, SCD mutation survival in family is due to heterogeneous or carrier genotypes that cannot be determined or removed by natural selection. Also, SCD is usually found in areas where malaria parasites spread and is often related to G6PD or found as SCD carrier.

Moreover, SCD spread is not confined to areas where malaria spreads. It provides a selective form of malaria resistance, but it is more spread among dark complexion people. Furthermore, Low health and cultural awareness about genetic blood diseases, including SCD, negatively affects initiation of medical care and follow-up of such cases, especially SCD carriers who show symptoms only if exposed to severely low oxygen.

<table>
<thead>
<tr>
<th>Residential Quarter</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Makhzin</td>
<td>11</td>
<td>28.20</td>
</tr>
<tr>
<td>Door Al-Shuhada</td>
<td>8</td>
<td>20.51</td>
</tr>
<tr>
<td>Iskan</td>
<td>7</td>
<td>17.94</td>
</tr>
<tr>
<td>Door Al-Sood</td>
<td>6</td>
<td>15.83</td>
</tr>
<tr>
<td>Al-Zuhoor</td>
<td>2</td>
<td>5.12</td>
</tr>
<tr>
<td>Mustashfa St.</td>
<td>5</td>
<td>12.40</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case</th>
<th>Male #</th>
<th>Female #</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>17</td>
<td>39</td>
<td>56</td>
</tr>
<tr>
<td>E</td>
<td>28</td>
<td>28</td>
<td>56</td>
</tr>
</tbody>
</table>

$X^2=8.6. \quad P<0.001.$

**Table 3 Chi-squared ($X^2$) test for SCD spread in the studied populations**

<table>
<thead>
<tr>
<th>Enzyme profile</th>
<th>Hemoglobin type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AA</td>
<td>SS</td>
</tr>
<tr>
<td>Normal E</td>
<td>35</td>
<td>26</td>
</tr>
<tr>
<td>Normal O</td>
<td>31,28</td>
<td>29,72</td>
</tr>
<tr>
<td>Low E</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Low O</td>
<td>9,74</td>
<td>9,26</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>39</td>
</tr>
</tbody>
</table>

$X^2=3.84. \quad P<0.05.$

**Table 4 Correlation between SCD and G6PD in Iskan town (2010-2011)**

<table>
<thead>
<tr>
<th>Case</th>
<th>Male #</th>
<th>Female #</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>10</td>
<td>29</td>
<td>39</td>
</tr>
<tr>
<td>E</td>
<td>19,5</td>
<td>19,5</td>
<td>39</td>
</tr>
</tbody>
</table>

$X^2=0.27. \quad P<0.001.$

**Table 5 Correlation between SCD and gender in Harthiya town (2010-2011)**

<table>
<thead>
<tr>
<th>Case</th>
<th>Male #</th>
<th>Female #</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>3</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>E</td>
<td>5,5</td>
<td>5,5</td>
<td>11</td>
</tr>
</tbody>
</table>

$X^2=0.07. \quad P<0.001.$

**Table 6 Correlation between SCD and gender in Harthiya town (2010-2011)**
Table 7 Frequencies and percentages of patients' age groups upon diagnosis in Iskan town (2010-2011)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>6</td>
<td>15.38</td>
</tr>
<tr>
<td>6-10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11-15</td>
<td>10</td>
<td>25.64</td>
</tr>
<tr>
<td>16-20</td>
<td>10</td>
<td>25.64</td>
</tr>
<tr>
<td>21-25</td>
<td>10</td>
<td>25.64</td>
</tr>
<tr>
<td>26-30</td>
<td>3</td>
<td>7.96</td>
</tr>
</tbody>
</table>

Table 8 Frequencies and percentages of patients’ age groups upon diagnosis in Harthiya town (2010-2011)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>6</td>
<td>35.29</td>
</tr>
<tr>
<td>6-10</td>
<td>1</td>
<td>5.88</td>
</tr>
<tr>
<td>11-15</td>
<td>6</td>
<td>35.29</td>
</tr>
<tr>
<td>16-20</td>
<td>1</td>
<td>5.88</td>
</tr>
<tr>
<td>21-25</td>
<td>3</td>
<td>17.64</td>
</tr>
<tr>
<td>26-30</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Ethical Clearance: Permissions for carrying out the study were obtained from the Authorities at Iskan and Al-Yarmook Hospitals, Baghdad, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Acknowledgment: The authors would like to take this opportunity to express their gratitude and thanks to Al-Mustaqbal University College for their continuous support during the current study.

REFERENCES

14. Lamia M. and Abdul-Jalile AM. Association


Effect of Fluoride Agent on the Load Deflection of Rhodium-Coated Arch Wires; An In-Vitro Study

Yasir Amer Nsaif 1, Abeer Basim Mahmood 1
1Department of Orthodontics, College of Dentistry, University of Baghdad, Baghdad/Iraq

ABSTRACT

Background: Patients are advised for routine use of prophylactic agents like mouthwashes to assist in control and prevention of dental caries or periodontal diseases since orthodontic treatment may have a damaging effect on the teeth structures. Though, chemical agents in mouthwashes may probably cause damage to the metal components of orthodontic appliances. The aim of this study was to evaluate and compare the effects of acidulated phosphate fluoride agent on the load deflection of Rhodium-coated Nickel Titanium and stainless steel arch wires. Method: Eighty cut pieces of 0.016 inches round arch wires were supplied from IOS Company, USA. Forty pieces were taken from each type of arch wires. These 80 cut pieces were arranged into 8 groups with 10 pieces in each group, half of these groups were tested in dry conditions and the other half were tested in wet conditions following immersing in acidulated phosphate fluoride solution at 37˚C for sixty minutes. With the use of Instron universal testing machine, the three-point bending test was done. Each cut piece of arch wire loaded on the machine and tested at different deflections (0.5, 1.0, 1.5, 2.0mm). With the use of computer-controlled software program (Tinius Horizon software), Load-deflection was recorded for each specimen. Then, the obtained data were analyzed using ANOVA and post hoc Tukey’s test. Results: A significant decrease was noticed in the loading forces of the conventional Nickel Titanium and stainless steel arch wires following immersion in acidulated phosphate fluoride solution. On the other hand, acidulated phosphate fluoride did not show any effects on the load deflection and mechanical features of Rhodium-coated arch wires. Conclusion: Conventional Nickel-Titanium and stainless steel arch wires degenerated in the presence of acidulated phosphate fluoride agent. Therefore, the patient and the dentist should carefully use the fluoride-containing products. However, Rhodium coating protected the arch wire from the effects of acidulated phosphate fluoride agent and fluoride did not have a significant effect on the loading force of these arch wires.

Keywords: Loading force, acidulated phosphate fluoride, Rhodium-coated arch wires, Nickel-Titanium arch wires, stainless steel arch wires.

INTRODUCTION

Patients who are seeking orthodontic care consider the aesthetic appearance of the orthodontic arch wire a significant factor, therefore, various efforts have been invested to produce aesthetic arch wires [1].

Generally, several modern aesthetic arch wires have been introduced continuously into orthodontic practice and there were few published literature concerning the properties of coated Nickel Titanium and stainless steel wires [2].

Rhodium-coated arch wires are being getting distinction in orthodontic treatment during the last few years with outstanding anti-corrosion properties as well as with an aesthetic characteristic that can resist within an oral cavity environment [3].

These arch wires are presented as high aesthetic wires because rhodium provides a high gloss to the arch wire, giving it less visible appearance. It supports current orientation for using more biocompatible and stable materials from the noble material groups [4].

During orthodontic treatment which extends over a number of months, a matrix that hosts a microorganism retained around the orthodontic appliance components [5]. The rise in the number of bacteria requires the use
of prophylactic agents for prevention of dental and periodontal diseases [6].

A Fluoride prophylactic agent has been used broadly to inhibit demineralization of teeth structures and re-mineralization of defected parts around orthodontic bands and brackets; nevertheless, the fluoride ions found in the prophylactic agents have been affirmed to produce discolorations, corrosion and degradation in the mechanical features of arch wires leading to a drop in required orthodontic forces and, thus, limiting straightening of irregular teeth [7].

This in vitro study was aimed to find whether or not exposure to acidulated phosphate fluoride would affect the load deflection of Rhodium-coated and conventional nickel titanium and stainless steel arch wires.

**MATERIALS AND METHOD**

The study samples included 0.016 inches upper preformed round arch wires from IOS® (International Orthodontic Services, Stafford, USA), they were Rhodium-coated Nickel-Titanium and Stainless-Steel (Fantasia Arch wires)™ with Conventional Nickel-Titanium and Stainless-Steel(The Ultimate Wire)™.

Acidulated phosphate fluoride solution was the Immersion media (Phos-flur rinse™ 1.23%, Colgate Oral Pharmaceutical, New York, U.S.A.) which consist of sodium fluoride 0.044% w/ v, pH=4.2, 225ppm with hydrofluoric and phosphoric acids.

The samples of the study included eighty cut pieces of wire; all specimens were made by cutting 30mm segment from the straight distal portion of the preformed arch wire determined by using a digital vernier and permanent marker [8, 9].

The total samples included 80 cut pieces (forty pieces from each type of arch wires). Those 80 cut pieces of wire were divided into 8 groups with 10 cut pieces in each group; half of the groups were tested in a dry condition while the other half of groups were tested in wet condition using acidulated sodium fluoride solution. Half of the cut pieces to be examined in wet condition were stored in inert plastic containers that have 10ml capacity with 5ml of acidulated phosphate fluoride solution [7] at temperature of 37ºC into an incubator [10, 11] for around sixty minutes. This is approximately equals to two months of one minute of daily topical fluoride use as suggested by manufacturing instructions [7].

Each piece of the arch wire that was immersed in fluoride solution was taken out from the immersion solution and rinsed with use of distilled water, then it was placed in a new clean plastic container to be ready for testing [7].

Three-point bending test was used to test the load deflection of arch wires by using the Instron universal testing machine. Each specimen of arch wire was loaded and tested at 0.5, 1.0, 1.5, 2.0mm of deflection. The latter was calculated with a computer-controlled software program attached to the machine. ANOVA, t-test and HSD tests were used for statistical analyses of data.

![Figure 1](attachment:image1.png)

**RESULTS**

The means and the standard deviations for the loading force of conventional stainless steel and nickel-titanium arch wires in wet and dry conditions are shown in Table 1.

For both of arch wires, there was a progressive elevation of loading force with the increase of deflection. Nevertheless, following immersion in acidulated phosphate fluoride solution, there was a significant reduction in the loading force for all deflections (0.5-2mm) of nickel-titanium arch wires. When it comes to conventional stainless steel arch wires, APF has
decreased the loading force of the wire significantly for all of its deflections, except for 0.5mm that revealed a non-significant difference.

Table 1 Descriptive statistics of the load deflection and effect of fluoride on conventional arch wires

<table>
<thead>
<tr>
<th>Wire type</th>
<th>Deflection (mm)</th>
<th>Descriptive statistics</th>
<th>Comparison (df=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dry</td>
<td>S.D.</td>
</tr>
<tr>
<td>NiTi</td>
<td>0.5</td>
<td>122.361</td>
<td>12.019</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>205.978</td>
<td>12.764</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>231.573</td>
<td>9.716</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>259.002</td>
<td>8.928</td>
</tr>
<tr>
<td>SS</td>
<td>0.5</td>
<td>241.120</td>
<td>15.682</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>423.179</td>
<td>8.666</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>577.548</td>
<td>10.745</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>753.196</td>
<td>15.807</td>
</tr>
</tbody>
</table>

Table 2 displayed the load deflection of Rhodium coated nickel-titanium and stainless steel wires. It has been shown that fluoride did not have a significant effect on the loading force of Rhodium-coated Nickel-Titanium arch wires in all deflections (P>0.05).

Regarding the Rhodium-coated stainless steel arch wires, there was a non-significant difference of loading force in 1, 1.5, 2mm deflections after immersion in APF. On the other hand, 0.5mm deflection showed a statistically significant difference.

Table 2 Descriptive statistics of the load deflection and effect of fluoride on Rhodium-coated Ni-Ti and S.S. arch wires

<table>
<thead>
<tr>
<th>Wire type</th>
<th>Deflection (mm)</th>
<th>Descriptive statistics</th>
<th>Comparison (df=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dry</td>
<td>S.D.</td>
</tr>
<tr>
<td>NiTi</td>
<td>0.5</td>
<td>116.447</td>
<td>11.413</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>242.484</td>
<td>9.695</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>288.372</td>
<td>11.782</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>317.228</td>
<td>15.791</td>
</tr>
<tr>
<td>SS</td>
<td>0.5</td>
<td>248.777</td>
<td>12.167</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>426.296</td>
<td>13.453</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>600.154</td>
<td>18.737</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>816.867</td>
<td>16.317</td>
</tr>
</tbody>
</table>
DISCUSSION

Nickel-Titanium arch wires

Following immersion of conventional Ni-Ti arch wires in APF, it recorded a decrease in load deflection with a significant difference in comparison with loading force in a dry condition (without APF) in all deflections of the arch wires.

It looked that ionizable fluoride agents such as hydrogen fluoride and sodium fluoride in an acidic environment can generate hydrofluoric acid. It is proposed that hydrofluoric acid has the ability to destroy the protective oxide layer found on the surface of Ni-Ti arch wires to form titanium fluoride according to the following equations:

\[
\begin{align*}
H_3PO_4 + 3NaF & \rightarrow Na_3PO_4+3HF \quad \text{Equation (1)} \\
Ti_2O_3 + 6HF & \rightarrow 2TiF_3+3 \text{H}_2\text{O} \quad \text{Equation (2)} \\
TiO_2 + 4HF & \rightarrow TiF_4+2\text{H}_2\text{O} \quad \text{Equation (3)} \\
TiO_2 + 2HF & \rightarrow TiF_2+\text{H}_2\text{O} \quad \text{Equation (4)}
\end{align*}
\]

So the degeneration and loss of the oxide layer expose the underlying alloy material leading to corrosion and reduction in mechanical properties of the arch wire \cite{12}.

Fluoride agent causes the corrosion rate to be raised in an acidic environment and that agreed with \cite{10} and \cite{13} who affirmed that Ni-Ti arch wires had an increased corrosion rates in an acidic environment that caused further decrease of mechanical properties of nickel-titanium arch wires. Also, the findings of this study were in agreement with \cite{14} and \cite{15} who handled APF at the same concentrations of current study and reported a drop in mechanical characteristics of conventional nickel-titanium wires which confirmed the results of current study.

However, The findings of current study disagreed with the findings of \cite{16} who stated that load deflection of Ni-Ti arch wires was not changed by APF solution (Phosflur mouth rinse) and the mechanical characteristics of Nickel-titanium arch wires wer not affected.

**Stainless steel arch wires**

Loading force of S.S. arch wire has been decreased following immersion in APF solution for 60 minutes with a significant difference in loading force of wire between dry (without fluoride) and wet (with APF) conditions. This occurs because of the effect of APF solution on the coating layer found on the stainless steel that dissolves the chromium oxide coating layer and this agreed with \cite{17} who stated that corrosion resistance of stainless steel arch wires can be declined significantly in the presence of fluoride. The Cr2 O3 coating layer of SS arch wires reacts with fluoride according to the following equation:

\[
\text{Cr}_2\text{O}_3 + 2\text{NaF} \rightarrow \text{CrF}_2 + \text{Na}_2\text{O} + \text{CrO}_2
\]

**Rhodium coated arch wires**

Rhodium is a hard silvery-white metal that is a member of the platinum group. It is regularly alloyed with platinum or palladium that is applied in a high temperature that gives a corrosion-resistant coating. Rhodium-coated arch wires have a low reflectivity which is served as conferring reduced visibility and improved aesthetics \cite{18}.

In current study, Rhodium-coated Nickel-Titanium and Stainless Steel arch wires have been used. The effect of fluoride agent on the load deflection of both rhodium-coated Ni-Ti and S.S. has been tested with the use of APF solution.

The results showed that there was a non-significant effect of fluoride agent on the load deflection of both rhodium-coated Ni-Ti and S.S. arch wires that indicated that the AFP has no effects on the load deflection of these arch wires, except for 0.5mm deflection of S.S. It showed a statistically significant difference, yet it is of less clinical importance.

The results of current study can be attributed to the protective effect of the rhodium coating layer on the surface of rhodium-coated arch wires and it agreed with \cite{19} who stated that the rhodium coating protects the wire’s working properties caused by immersion into the fluoride-containing prophylactic agents leaving the uncoated conventional Ni-Ti arch wires the least protected.

Moreover, results of present study agreed with \cite{19} who showed that with exposure to APF, there was no significant effect on any of mechanical properties measured (P > 0.05), following fluoride exposure of rhodium-coated wires. These findings maybe due to effects of the coatings.
CONCLUSION

According to the findings of present study, there was a significant reduction in the loading forces of conventional Ni-Ti and S.S. arch wires after application of APF. This may be clinically important because the reduction in forces could contribute to prolonging orthodontic tooth movement. Moreover, rhodium-coated arch wires were suitable and most convenient to be used with APF because the loading force of these arch wires did not decline.

Ethical Clearance: Permissions for carrying out the study were obtained from 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

17. Pulikkottil VJ, Chidambaram S, Bejoy PU, Femin

18. Flanagan J. Comparison of the mechanical and surface properties of retrieved and unused aesthetic orthodontic archwire (Doctoral dissertation, University of Birmingham); 2015.

**Effects of *Cichorium intybus* Methanolic Extracts on Some Clinical Bacterial Isolates**

Baydaa H. Abdullah¹, Fitua Al-Saedi¹, Ahmed E. Salman¹

*College of Pharmacy/ University of Al-Mustansiriya, Iraq*

**ABSTRACT**

**Background:** *Cichorium intybus* is a scientific name of a bushy perennial herbaceous plant, its common name is chicory, and in Iraq it is called Hindibah. This medicinal plant is widely used all over the world as a popular herbal remedy. Therefore, the aim of this study was to evaluate the antibacterial activity of alcoholic extracts of leaves, stems and seeds of *Cichorium intybus* on most frequently isolated bacteria from human infections. **Methodology:** Antibacterial activities of methanolic extracts of leaves, stems and seeds of *Cichorium intybus* of different concentrations (25, 50, 100, 200, 400, 800, 1000 mg/ml) were tested against eight different species of bacteria, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *E. coli*, *Klebsiella* spp., *Proteus vulgaris*, *Enterobacter* spp., *Lactobacillus* spp and *Streptococcus faecalis*, isolated from different human lesions. **Results:** No inhibitory effects had been found of methanolic extracts of all concentrations of stems and seeds of *Cichorium intybus* on all the bacterial species tested under the present experimental conditions. In addition, no inhibitory effects had been observed of 25mg/ml concentration of methanolic leaves extracts on all tested microorganisms. The highest activity (more than 12mm growth inhibition) was obtained with 1000 mg/ml concentration of leaves methanolic extract against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella* spp, *Proteus vulgaris*, *Lactobacillus* spp and *Streptococcus faecalis*; whereas *E.coli* and *Enterobacter* spp. showed the lowest inhibitory activity at this concentration. **Conclusion:** The results had indicated that higher concentrations of leaves methanolic extracts might be needed to show their antibacterial effects and this could be true also with respect to methanolic extracts of stems and seeds. Also, there were no observed effects of methanolic extracts of these parts of *Cichorium intybus* on the bacterial species under the present experimental conditions. **Keywords:** Antibacterial activity, Methanolic extract, Zone of inhibition, *Cichorium intybus*, DMSO.

**INTRODUCTION**

A large-scale setting of human and animals to antibacterial treatment have resulted in an increased antibiotic resistance in bacteria potentially pathogenic to human and related domestic animals¹-². Continuous use of synthetic antibiotic results in threats to consumers and non-target organisms in the environment. Treatment of bacterial diseases with various herbs has been safely and widely used in veterinary and human medicine³. Since ancient times, medicinal plants have been used for treatment of common infectious diseases⁴. Medicinal plants as the alternative agents are effective to treat infectious diseases and mitigate many of the side effects that are associated with synthetic antimicrobials. In addition, plant-derived phytochemicals provide a cheaper source for medicines and greater accuracy than chemotherapeutic agents in this field⁵. The common chicory, *Cichorium intybus*, is a bushy perennial herbaceous plant with blue lavender or occasionally white flowers. It is a member of family *Asteraceae* and it is worldwide-distributed⁶. Chicory is a popular herbal remedy, and due to its contents of inulin, oligo fructose, minerals, vitamins, fatty acids, tannin, glycosides, etc.⁷. They are useful for purifying blood and liver, healing several ailments such as jaundice, treatment of spleen problems and gallstones. Also, they are useful for treatment of rheumatism, goat and for loss of appetite. The leaves may also be used as compresses to be applied externally to ease skin inflammation and swelling⁶. Moreover, the fresh leaves are used in salad as spices.

In Iraq, it is grown in rural region of northern, central and southern parts and could be grown in fields...
and home gardens. The dried leaves and roots of chicory plants are collected in autumn for medicinal purposes. When flowering, the whole plant is collected and dried. Chicory is well-known for its bitter taste and used as a coffee substitute. However, there is limited knowledge about antimicrobial activity and health benefits of *Cichorium intybus* (Hindibah) in Iraq. Therefore, the aim of this study was to evaluate the antibacterial activity of alcoholic extracts of leaves, stems and seeds of *Cichorium intybus* on most frequently isolated bacteria from human infections.

**MATERIALS AND METHOD**

**Collection of plants**

Leaves, stems, and seeds of *Cichorium intybus* used in this study were purchased from local herbal stores.

**Preparation of extracts**

The dried leaves, stems, and seeds were crushed with mortar and pestle or electric mill. Thirty grams of each dry powdered plant material was extracted with 300ml of 80% methanol for 10hrs by using soxhlet equipment \([8]\). The extract was filtered using whatman filter paper no.1 and filtrate was then evaporated by using rotary evaporator. The resultant dry extracts were left at 4°C until assessment of their antibacterial activities.

**Test organisms**

The test organisms used in this study were *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *E.coli*, *klebsiella spp*, *Proteus vulgaris*, *Enterobacter spp*, *lactobacillus spp* and *streptococcus faecalis*. These species were obtained from Medical City Hospital laboratories, Baghdad and were originally isolated from various clinical lesions obtained from out-patients attended the Hospital of Medical City out-patient clinics. All the clinical isolates were identified and checked for purity using the methods describes by Forbes et al. \([9]\). Then, isolated bacteria were maintained in the test tube slants of Muller-Hinton agar medium at 37°C and subcultures were prepared from stocks for bioassay when needed.

**Antibacterial assay**

Pure culture of each bacterial strain was grown on tryptic soy agar (TSA) plates and incubated for 2 day at 37°C. Four-five loops from each strain were transferred into culture tubes containing 5ml sterile TSA broth and were incubated for 12hrs at 37°C. Muller- Hinton agar plates were inoculated with microorganism suspension at a concentration of 106cell/ml by using cotton swabs. The plant material extract (leave, stems and seeds) were dissolved in 10% dimethyl sulfoxide (DMSO) in order to obtain a final concentrations of (1000, 800, 400, 200, 100, 50 and 25mg/ml). The agar well diffusion method was used to determine antibacterial activity of extracts \([9]\). Six-millimeter diameter wells punched into the agar and filled with 0.1ml of each extract. Negative control included 10% DMSO solvent without plant extract while positive control consisted of four different antimicrobial susceptibility test discs: Erythromycin (15mg/ml), Cefalothin (30mg/disc), Clindamycin (2mg/disc) and Tetracycline (30mg/disc). Each concentration of plant extract was evaluated in triplicate for its antibacterial activity. The plates then incubated at 37°Cfor 24hrs. At the end of the period, the antibacterial activity was evaluated by measuring the diameter of inhibition zone.

**Statistical analysis**

Data of the effects of different concentrations of leaves on microorganism are represented as means of three replicates and Chi-squared test was used to evaluate the differences in inhibition zones among the plant extracts.

**RESULTS AND DISCUSSION**

The effects of different concentrations, 1000, 800, 400, 200, 100, 50 and 25 mg/ml, of methanolic extracts of leaves of *Cichorium intybus* on growth of eight different species of bacteria, *staphylococcus aureus*, *pseudomonas aeruginosa*, *E.coli*, *proteus vulgaris*, *Klebsiella spp*, *Enterobacter spp*, *lactobacillus spp* and *streptococcus faecalis* (Table 1). These effects were studied in comparison with standard antibiotic, Erythromycin, cefalothin, clindamycin and tetracycline effect on these microorganism (Table2). There was no inhibition zone in the negative control 10% DMSO solution and no effect of methanolic extract of all concentration of stem and seeds of *Cichorium intybus* on all the bacterial species tested. At the same time, no effect of 25mg/ml of methanolic extract of leaves on all the organisms tested.

Leaves extracts of 50mg/ml, 100mg/ml, 200mg/ml and 400mg/ml concentrations showed no effects on
the lactose-fermenting bacteria (E. coli and Klebsiella spp). On the other hand, lower concentrations, 50mg/ml and 100mg/ml, had no effects on lactobacillus spp. and Streptococcus faecalis (Table 1). All the species of bacteria tested have been affected by higher concentrations of methanolic leaves extract of Cichorium intybus (Table 1) and the most remarkable inhibition was more than 10mm, at a concentration ≥200mg/ml, was seen on staphylococcus aureus, pseudomonas aeruginosa, klebsiella spp., proteus vulgaris, lactobacillus spp. and streptococcus faecalis. However, the least inhibition was less than 7.34mm, at a concentration <100mg/ml. Inhibition zones of 7 mm and 8mm were seen at 50mg/ml and 100mg/ml concentrations, respectively, but not at concentrations of 200mg/ml and 400mg/ml, then higher, 9.34mm and 12.34mm, inhibition zones were seen at 800mg/ml and 1000mg/ml. These findings might be due to some technical errors or some of environmental conditions concerning the experiments. With respect to the response of staphylococcus aureus, the inhibitory effects of various leaves extracts concentrations showed that the inhibition zones increased from 7.67mm up to 13.67mm as the concentration of leaves extracts increased from 50mg/ml to 1000mg/ml. Again the gram negative bacilli lactobacillus spp. showed almost the same high zones of growth inhibition (13-15mm) at concentrations of leaves extracts more than 200mg/ml. These results may indicate that leaves methanolic extracts at concentrations more than 50mg/ml have more antibacterial activity than both stem and seed methanolic extracts. The latter might confirm the fact that leaves contain some constituents such as alkaloids, saponin, glycoside and flavonoids which exert antimicrobial activities [11,12].

Table 1 The effects of different concentrations of methanolic extracts of leaves of Cichorium intybus on the eight bacterial isolates of interest

<table>
<thead>
<tr>
<th>Bacteria &amp; Antibiotic</th>
<th>Inhibition zone (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>13.7±2.5</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>12.7±1.5</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>8.7±0.6</td>
</tr>
<tr>
<td>Klebsiella spp</td>
<td>12.7±0.6</td>
</tr>
<tr>
<td>Proteus vulgaris</td>
<td>12.3±0.6</td>
</tr>
<tr>
<td>Salmonella typhi</td>
<td>-</td>
</tr>
<tr>
<td>Enterobacter spp</td>
<td>9.7±1.5</td>
</tr>
<tr>
<td>Lactobacillus spp</td>
<td>14.3±1.5</td>
</tr>
<tr>
<td>Staphylococcus faecalis</td>
<td>11.3±1.5</td>
</tr>
</tbody>
</table>

Haken et al. [13] showed that water, ethanolic and methanolic leaves extracts of Cichorium intybus at concentrations of 6.5%, 7.5% and 4% had no inhibitory effects against the growth of the pathogens Aeromonas hydrophila, Yersinia ruckeri, Lactococcus garviea, streptococcus agalactiae and enterococcus faecalis using disc diffusion assay. However, these results did not agree with those of present study as the growth of streptococcus faecalis was highly inhibited (13.34mm) at leaves extract concentrations of ≥200 mg/ml.

It is noteworthy that the different results of antibacterial activity against different human pathogens obtained with the use of herbs extracted with different extraction methods (aqueous, methanolic and ethanolic) were controversial [14,15] in comparison with the standard antibiotic. Table 2 shows inhibition of Erythromycin (15mg), Tetracycline (30mg) and Clindamycin (2mg) on staphylococcus aureus and lactobacillus spp. On the other hand, Enterobacter spp and streptococcus faecalis were responded only to Erythromycin (15mg) and Tetracycline (30mg), respectively, while other bacteria tested were all resistant to all antibiotics used in this
The inhibition zone represents the mean of three replicates.

E= Erythromycin (15Mg)

KF= Cefalothin (30Mg)

Te= Tetracycline (30mg)

Da= Clindamycin (2mg)

Unfortunately, there are few studies concerning the herbal chemical composition and medicinal remedies of *Cichorium intybus* in the world and in Iraq, as well. Recently Al-Ethari [16], studied the chemical, elemental and types of sugars contents of the roots of Iraqi grown *Cichorium intybus*. He determined the percentage of moisture, protein, oil and total ash as 1.15%, 1.57%, 5.54% and 8.25%, respectively, by using flame atomic absorption. The total percentage of Ca, Na, K, P and Mg were 0.33%, 0.51%, 1.25%, 1.17% and 0.11%, respectively, while the content of sugars, inulin, glucose and fructose were 1.2, 7.1 and 2.62gm/100ml, respectively, using high pressure liquid chromatography (HPLC). However, the present study might be the first study concerning the antimicrobial effects of *Cichorium intybus* L. on different human bacterial pathogens in Iraq. We have to recall that, the 80% methanol as an extraction solution for the active ingredient (antibacterial) from the stem and seeds was not efficient due to ineffectiveness of their extracts as antimicrobials and this does not exclude that these parts of Chicory plant from its content of such active ingredients. However, other extraction methods; aqueous, ethanolic, methanolic etc. and different combinations of these must be tried for this purpose. These would be the focus of future study(s).

Therefore, we recommend the use of extracts of all parts of chicory plants (roots, stems, leaves, seeds and flowers) to investigate the active ingredients as therapeutics agents for treating inflammatory and infection diseases in humans and this might support the facts that herbal remedies play a fundamental role in traditional medicine.

**Ethical Clearance**: Permissions for carrying out the study were obtained from the Research Ethics Committee at College of Sciences/ Mustansiriyah University, Baghdad, Iraq.

**Financial Disclosure**: There is no financial disclosure.

**Conflict of Interest**: None to declare

**REFERENCES**


Mothers’ Knowledge Towards Prevention of Early Childhood Home-Injuries at Babylon Province, Iraq

Abbas Fadhel Jassem1, Nuhad Al-Doori1, Abd- Almahdi Abd- Redha1
1PhD Pediatric Nursing, Faculty of Nursing / University of Babylon, Iraq

ABSTRACT

Background: Injuries are the foremost foundation of death which are considered as an international problem when killed over 630,000 persons especially in children under 15 years old. Therefore, the aim of current study was to assess mothers’ knowledge regarding prevention of early childhood home-injuries at Babylon province, Iraq. Methodology: Descriptive study conducted at Babylon Hospital for Maternity and Pediatric, Ibn-Saif Hospital and Al-Noor Hospital for Pediatrics in Babylon city. Participants were chosen by non-probability (purposive) sampling method which consisted of 218 mothers admitted to the hospitals with their children.

Result: The result revealed that the 42.7% of mothers were within the age group (27-37) years old. In regard to the educational level, findings indicated that most of them (41.3%) were institute and above graduates and (60.6%) work as housewives. Also, current study revealed that the majority (83.5%) of mothers had knowledge regarding prevention of childhood injuries in Hilla City.

Conclusion and recommendations: Mothers’ socio-demographic characteristics did not influence their knowledge. The study recommended that knowledge is an important aspect in preventing accidents. More studies can be conducted at a national level and to evaluate knowledge in rural areas.

Keywords: Childhood injuries, Mothers knowledge, Educational level, socio-demographic data, Purposive sampling.

INTRODUCTION

Injuries are the foremost foundation of death which are considered as an international problem when killed over 630,000 persons especially in children under 15 years old. In addition, several thousand children who live with different degrees of disability due to injuries in or around home, like drowning, burns or falls.

Accidents are highest causes of death among children aged between one and five years as well as they were one of the five essential causes of death in developing countries annually. Explorative nature of children, affected by assured influences, had upraised the possibility of home accidents that take place in rural areas than the urban. In addition to living conditions, mother’s educational status, age of mother, number of children in family and both indoor and outdoor nearby environment, are factors that may contribute to the possibility of home accidents.

Therefore, particular accident looking forward activities should be carried out by mothers through addressing knowledge and strengthen their orientations, as they are energetic care providers and are forcefully responsible to support child’s curiosity and perk up their security from the incomparable challenges of involuntary injuries. Most parents cannot ascertain particular preventive strategy that the specified parents do not hold a strong belief in the preventability of injuries though they believe that they can someway retain their child not dangerous. A family with active adolescents is a momentous family for the reason that children at this age need an astonishing arrangement of time. Their creative energy is at such a crest, to the point that security contemplations, for example, keeping away from inadvertent accidents develop as a critical wellness concern. On the off chance that a little child is hospitalized in light of a mishap, guardians may also have battling giving consideration since they believe
that they have achieved more prominent to stop the tyke’s damage. It might, likewise, be trying for father and mother to room in at the wellbeing focus because of the reality they have other more youthful youth at local who need mind. On the off chance that the baby returns household for additionally mind, a family in this stage can likewise need endured help and assistance from an area wellbeing medical caretaker to give essential social insurance to the wiped out tyke[4]. Therefore, the aim of current study was to assess mothers’ knowledge regarding prevention of early childhood home-injuries at Babylon province, Iraq.

**METHODOLOGY**

Descriptive study conducted on 218 mothers who were admitted to the pediatrics hospitals (Babylon Hospital for Maternity and Pediatrics, Ibn-Saif Hospital and Al Noor Hospital for Pediatrics) at Babylon city between 15th, February and 15th, March 2018 at some stage in the existing research. Sampling method used in the study was non-probability (purposive sampling) involved 218 mothers admitted to the hospitals with their children. The tool has been planned and built by the authors after searching related sources and preceding research paper. The tool is applied as a means of facts series. Collection of data was carried out via the application of the interview by using the tool which is the questionnaire introduced to the mothers who have been admitted to the mentioned hospitals. The information was accrued after getting the settlement of the members, who interviewed and informed them of the purposes and objectives. Data were analyzed using Statistical Package for Social Sciences (SPSS) version 22.

**RESULTS**

Table 1) reveals that 42.7% of mothers were within the age group (27-37) years old. Regarding the educational level, findings of current study indicated that most of them (41.3%) were institute and above graduates and (60.6%) worked as housewives. Regarding their knowledge and sources of such knowledge, results indicated (86.2%) have knowledge and (65.6%) of them acquired these knowledge from friends and neighbors.

**RESULT**

Table 1 Distribution of the study sample according to their demographical data.
Table (2) shows that each one of mothers’ responses well knowledgeable in relation to prevention childhood injuries.

Table 3) well-known shows that common of (83.5%) of mothers had understanding regarding prevention of childhood injuries in Hilla City.

Table (4) presents a non-significant connotation between mother’s knowledge and their demographic characteristics at P >0.05.

**Table 2 Distribution of mothers’ knowledge concerning prevention childhood injuries**

<table>
<thead>
<tr>
<th>List</th>
<th>Knowledge Items</th>
<th>Scale</th>
<th>F</th>
<th>%</th>
<th>M.S.</th>
<th>S.d.</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Most injuries to young children occur at home.</td>
<td>Don’t Know</td>
<td>27</td>
<td>12.4</td>
<td>2.65</td>
<td>0.69</td>
<td>Know</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>169</td>
<td>77.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>218</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mothers prevention measurement is important to decrease the risk of children injuries</td>
<td>Don’t Know</td>
<td>6</td>
<td>2.8</td>
<td>2.83</td>
<td>0.44</td>
<td>Know</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>188</td>
<td>86.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>218</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mothers with young children should know about first aids</td>
<td>Don’t Know</td>
<td>16</td>
<td>7.3</td>
<td>2.76</td>
<td>0.57</td>
<td>Know</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>182</td>
<td>83.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>218</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Home had many causes to produce accident.
**Table 2 Distribution of mothers’ knowledge concerning prevention childhood injuries**

<table>
<thead>
<tr>
<th></th>
<th>Don’t Know</th>
<th>11</th>
<th>5.0</th>
<th>Not Sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Sure</td>
<td>24.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>70.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know</td>
<td></td>
<td>2.65</td>
<td>0.57</td>
<td>Not Sure</td>
</tr>
<tr>
<td>153</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>218</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

"Childhood injuries are the leading cause of death in children from birth - 6 years,"

<table>
<thead>
<tr>
<th></th>
<th>Don’t Know</th>
<th>41</th>
<th>18.8</th>
<th>Not Sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Sure</td>
<td>49.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>107</td>
<td>32.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know</td>
<td></td>
<td>2.13</td>
<td>0.70</td>
<td>Not Sure</td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>218</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Falls are the most common injury that results in hospital admission of children from birth – 6 years

<table>
<thead>
<tr>
<th></th>
<th>Don’t Know</th>
<th>39</th>
<th>17.9</th>
<th>Not Sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Sure</td>
<td>34.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>47.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know</td>
<td></td>
<td>2.29</td>
<td>0.75</td>
<td>Not Sure</td>
</tr>
<tr>
<td>103</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>218</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Drugs are the common cause of poisoning

<table>
<thead>
<tr>
<th></th>
<th>Don’t Know</th>
<th>47</th>
<th>21.6</th>
<th>Not Sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Sure</td>
<td>40.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>38.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know</td>
<td></td>
<td>2.16</td>
<td>0.75</td>
<td>Not Sure</td>
</tr>
<tr>
<td>83</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>218</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Home injuries for children are preventable
Continued Table 2 Distribution of mothers’ knowledge concerning prevention childhood injuries

<table>
<thead>
<tr>
<th></th>
<th>Don’t Know</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>6</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>Not Sure</td>
<td>17.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>79.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know</td>
<td>2.77 0.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>174</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>218</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Most burns are caused in the home by incidents involving hot water and food,

<table>
<thead>
<tr>
<th></th>
<th>Don’t Know</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>24</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>Not Sure</td>
<td>25.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>63.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know</td>
<td>2.52 0.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>139</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>218</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The kitchen is considered the most dangerous place in the house for children,

<table>
<thead>
<tr>
<th></th>
<th>Don’t Know</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>5</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Not Sure</td>
<td>18.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>79.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know</td>
<td>2.77 0.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>173</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>218</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*F= Frequency, %= Percentage, M.S.= Mean of score “ Cut off point (0.66), Don’t Know (mean of score 1-1.66), Not Sure (mean of score 1.67-2.33), Know (mean of score 2.34 and more)”, S.d= Stander deviation,“.*
Table 3 Overall assessment of mothers’ knowledge concerning prevention childhood injuries

<table>
<thead>
<tr>
<th>Mothers’ Knowledge</th>
<th>Scale</th>
<th>F</th>
<th>%</th>
<th>M.S.</th>
<th>S.d.</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fail</td>
<td>6</td>
<td>2.8</td>
<td>2.81</td>
<td>0.46</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>30</td>
<td>13.8</td>
<td>2.81</td>
<td>0.46</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>Pass</td>
<td>182</td>
<td>83.5</td>
<td>2.81</td>
<td>0.46</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100</td>
<td>2.81</td>
<td>0.46</td>
<td>Pass</td>
<td></td>
</tr>
</tbody>
</table>

“F= Frequency, %= Percentage, M.S.= Mean of score “ Cut off point (0.66), Fail (mean of score 1-1.66), Fair (mean of score 1.67-2.33), Pass (mean of score 2.34 and more)” , S.d= Stander deviation,”.

Table 4 Relationship between mothers’ knowledge and their demographic data

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Scale</th>
<th>Overall Knowledge</th>
<th>obs.</th>
<th>d. f</th>
<th>crit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td>Fail</td>
<td>Fair</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>16-26</td>
<td>2</td>
<td>15</td>
<td>71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27-37</td>
<td>3</td>
<td>13</td>
<td>77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38-48</td>
<td>1</td>
<td>2</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥49</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>30</td>
<td>182</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value= 0.761 →NS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Scale</th>
<th>Overall Knowledge</th>
<th>obs.</th>
<th>d. f</th>
<th>crit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to red and write</td>
<td></td>
<td>Fail</td>
<td>Fair</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>Read and write</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary School</td>
<td>0</td>
<td>6</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary school</td>
<td>1</td>
<td>3</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institute and above</td>
<td>3</td>
<td>14</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>30</td>
<td>182</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value= 0.617 →NS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Scale</th>
<th>Overall Knowledge</th>
<th>obs.</th>
<th>d. f</th>
<th>crit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>House wife</td>
<td>3</td>
<td>20</td>
<td>109</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>3</td>
<td>10</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>30</td>
<td>182</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value= 0.676 →NS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>knowledge about home accident</th>
<th>Scale</th>
<th>Overall Knowledge</th>
<th>obs.</th>
<th>d. f</th>
<th>crit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>0</td>
<td>5</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
<td>25</td>
<td>157</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>30</td>
<td>182</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value= 0.171 →NS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sources of knowledge</th>
<th>Scale</th>
<th>Overall Knowledge</th>
<th>obs.</th>
<th>d. f</th>
<th>crit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friends and neighbors</td>
<td>3</td>
<td>23</td>
<td>117</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass media</td>
<td>1</td>
<td>1</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary health care center</td>
<td>1</td>
<td>3</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous experience</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>1</td>
<td>3</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Books and magazine</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>30</td>
<td>182</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value= 0.680 →NS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

Mothers’ socio-demographic data

Mother’s socio-demographic traits have a quite essential effect on their children exposure to different types of home accidents. Findings of current study revealed that 42.7% of mothers were within the age group (27-37) years old. This result is concurrent with a study that has investigated knowledge, mindset and exercise amongst Egyptian mothers about home-related accidents in region in El-Minia Governorate, Egypt. Findings indicated that 35% of participants aged 25-35 years old [5].

In regard to the educational level, findings indicated that most of them (41.3%) were institute and above graduates and (60.6%) work as housewives. In light of these results, a study has been conducted on (100) mothers who were reviewed for maternal and child care. Findings revealed that most of study participants (33%) had primary school educational level and most of them (73%) were housewives [6].

When asking mothers about their knowledge and sources of such knowledge, the results indicated that 86.2% of them had knowledge and (65.6%) of them acquired that knowledge from friends and neighbors. More than half of mothers had experience with home accidents and the most of these accidents (22.5%) were home injuries. A previous study conducted in Sharkia Governorate concerned mothers’ schooling and their information about domestic accidents prevention amongst preschool children [3]. The latter study showed that regarding educational level, (33.3%) had completed university education; whereas, (25.3%) of them were illiterate. Occupational status showed that (58%) of studied mothers didn’t work (only at homes). Main source of their knowledge was from “radio and television” (24%) then “doctors and nurses” (15.3%), “part of curriculum” nearly (14%) and the lowest source was from “books” (6.7%). In addition, that study showed that 55.3% of studied mothers did not have any knowledge about the causes of home accidents.

In current study, the friends and neighbors considered better than the radio and television, because the results of population of El-Sabely as mentioned above did not have any knowledge about the causes of home accidents [7].

Another similar study indicated that 58.5% of mothers were aged 26-35 years old and 57.1% of them had 1-2 Children. In regard to educational level and occupation, most of them (56.5% and 90.9%) were primary school graduates and housewives, respectively [3].

Mothers’ knowledge towards prevention of childhood injuries

Findings of current study revealed that the majority (83.5%) of mothers at Hilla town had good knowledge regarding prevention of childhood injuries. Results of studies that come along with this study had investigated the data and practices for domestic accidents among 756 mothers of educational institution youngsters in urban center Southwest regime space, Nigeria. Pretested form with a 15-point data scale regarding domestic accidents. Results indicated that data on causes and interference of domestic accidents were high among respondents and preventive practices ought to be reinforced. Academic interventions adore coaching and public enlightenment geared toward empowering mothers and vital others to be additional concerned within the interference of domestic accidents among their educational institution youngsters area unit suggested [9].

Moreover, another study conducted by [2] aimed to assess mothers’ knowledge and their practices in prevention of home accidents among toddlers. Results of that study indicated that half of the population (55.6%) had knowledge about prevention of home accidents.

On the other hand, our results agreed with [10] who had studied epidemiologic patterns of domestic accidents and preventive measures. The latter was a cross-sectional survey aimed to determine the patterns of domestic accidents in the community and to assess the knowledge of participants relating to their interferences. The findings revealed that home accidents were fewer among those children and mothers were already aware of how to deal with such accidents in households.

Moreover, another study [6] had assessed mothers’ knowledge concerning avoidance of slight accidents in kids. After statistical analysis, results revealed that most (73%) of participants had average knowledge, 26% had good knowledge and least (1%) had poor knowledge regarding accidents prevention in infants and toddlers. So, the study recommended prevention of accidents among children under five. Also, it recommended that people should be educated and made aware about
accidents preventive measures in infants and toddlers through different means such as media which may help prevent accidents.

In addition, mothers’ knowledge reported in present study is consistent with a study that had investigated prevalence of home accidents among 0-6-years old children and mothers’ levels of precaution-taking behaviors. The latter study was cross-sectional study. After statistical analysis, results indicated that mothers perceived their childhood injuries at a mean of (2.53) \([11]\).

**Relationship between mothers’ knowledge and their demographic data**

Childhood is a stage that extends from the period of breastfeeding, early childhood, until adolescence. Throughout this period, the mothers must have knowledge about injuries faced by their children and the factors that are related to them in order to prevent these injuries. Findings of current study revealed that there is a non-significant association between the mothers’ knowledge and their sources of that knowledge, on one hand, and demographic characteristics (age, education, occupation) on the other hand, \((P>0.05)\). Current results agreed with those reported by a previous study \([7]\) which showed that the relation between mothers’ demographic data and their knowledge regarding causes of home accidents was proved to be statistically insignificant \((P>0.05)\).

Moreover, \([12]\) had studied mothers’ awareness about kids injuries and avoidance at household. Their findings indicated that no significant enhancement of knowledge towards interference was well-known, neither any connotation to mothers’ socio-demographic features.

**CONCLUSION AND RECOMMENDATION**

Knowledge concerning prevention of childhood injuries, mothers were pass. In addition, Friends and neighbors were considered the main source of mothers’ knowledge concerning prevention of childhood accidents at home. Mothers’ socio-demographic characteristics did not influence their knowledge. The study recommended that knowledge is an important aspect in preventing accidents. Further studies can be conducted at a national level and to evaluate knowledge in rural areas.

**Ethical Clearance:** Permissions for carrying out the study were obtained from the Research Ethics Committee at the Health Directorate of Babylon City.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**REFERENCES**

1. World Health Organization. TEACH-VIP 2. 2017

Determination of Glucagon-Like Peptide-1 and Dipeptidyl Peptidase-4 Levels in Diabetic Nephropathy Patients

Nibras Ala’a Hussein1, Tamara Ala’a Hussein2, Noorhan Khalid Shafeeq1

1Department of Family and Community Medicine/ College of Medicine/ University of Al-Nahrain/Iraq,
2Department of Basic Sciences/ Faculty of Dentistry/ University of Kufa/Iraq, 3Department of Chemistry/ College of Education, (Ibn-Al-Haitham) for pure Science/ University of Baghdad/Iraq

ABSTRACT

Background: Diabetic Nephropathy plays a key role in the function of kidneys to work for removing extra fluid and waste products from the body. The best way to prevent diabetic nephropathy is by maintaining a healthy lifestyle and treating diabetes and high blood pressure. Aim of the study was to locate the levels of Glucagon-Like Peptide-1 and Dipeptidyl Peptidase-4 in diabetic nephropathy patients and compare the results with the control group. Methods: The study involved 30 healthy controls and 30 diabetic nephropathy patients. Blood samples were collected from healthy controls and diabetic nephropathy patients after 12-14 hours of fasting. The study was conducted between April 2015 and September 2015 in the diabetic & endocrinology center in Al-Sadder Medical City, Iraq. Whole blood used in determination of HbA1c. Serum was obtained from other part of blood that used in determination of FBG, Albumin, Urea, Creatinine, Total cholesterol, Triglyceride, high-density lipoprotein-cholesterol, GLP-1 and DPP-4. The levels of low-density lipoprotein-cholesterol and very low-density lipoprotein-cholesterol were analyzed by using Friedewald equation. Results: The results showed significant elevation in FBG, HbA1c, GLP-1 and DPP-4 levels in diabetic nephropathy group comparing to control group. There was illustrated significant increased in TC, TG, LDL-c and VLDL-c in diabetic nephropathy group comparing to control group, while a significant decrease was noticed in HDL-c level in the patient group compared with the control group. Also, results of current study revealed a significant decrease in Albumin levels in diabetic nephropathy group comparing to control group. Moreover, the study showed a significant increase in Creatinine, Urea and Blood Pressure Levels in diabetic nephropathy group comparing to control group. Conclusion: there is significant association between Diabetic Nephropathy and raised FBS, HbA1C, GLP-1, DPP-4, TC, TG, LDL-c, VLDL-c, Creatinine, Albumin levels and Blood Pressure and significant decrease in Albumin, HDL-c level in diabetic nephropathy group compared to control group. It is, therefore, recommended to use (DPP-4) inhibitors which stimulate insulin release and inhibit glucagon releasing.

Key words: Diabetic Nephropathy, GLP-1, DPP-4, Creatinine, lipid profile.

INTRODUCTION

Diabetic nephropathy (DN) is a dangerous complication of diabetes; it starts with microalbuminuria and advances towards end-stage renal failure. It can stimulate subclinical renal inflammation and lead to deficiencies in renal response and consequently to renal failure [1]. Functional characteristics involve hyperfiltration, microalbuminuria, macroalbuminuria and progressive proteinuria which is then predominatingly followed by a gradual decrease in glomerular filtration rate (GFR). With the passage of time, it ends at the end phase renal disease (ESRD) requiring renal transplantation [2].

The glucagon-like peptide-1 (GLP-1) belongs to a family of hormones called incretins, so called because they enhance the secretion of insulin. They are secreted by the gastrointestinal enteroendocrine cells in reaction to intake of various nutrients. GLP-1 binds to β-cell receptors, stimulates insulin release and improves glycemic control and then play a protective role in treatment of DN [3]. Specifically, GLP-1 decreases inflammatory and oxidative stress markers in glomerular
endothelial cells [4].

Dipeptidyl peptidase-4 (DPP-4) is the cell surface aminopeptidase that was originally characterized as antigen differentiation of T cells (CD26). It is a multifunctional protein that engages in various biological activities, like protease activity, is associated with adenosine deaminase (ADA), interacting with extracellular matrix, cell surface receptors for viral entry, mediates, regulation of intracellular signal transduction and control of cellular migration and proliferation [5]. DPP-4 enzyme inhibitors can increase circulating levels of GLP-1 by stopping the ability of the enzyme to breakdown GLP-1. The significance of this is that GLP-1 can stimulate insulin production and, therefore, reducing blood glucose [6].

Dyslipidemia has been shown to play important roles in the development and progress of DN. Decreased lipoprotein metabolism, such as high-density lipoprotein cholesterol and increase low density lipoprotein (LDL). The latter was observed in diabetic patients. In addition to these quantitative changes, quality changes including small-density LDL and LDL oxidation (OX-LDL) make the protein more pro-atherogenic in diabetes [7,8].

Human serum albumin (HSA) is a non-toxic endogenous protein that can transfer different hydrophobic and hydrophilic drugs in the blood. HSA is the most abundant plasma protein and it is a single chain protein with a very high flexibility [9,10].

Serum urea and creatinine are increased with hyperglycemia in uncontrolled diabetics and usually correlate with severity of renal damage. There are easily available tests for this purpose which can assist in detection and prevention of diabetic renal disease at an early stage and can limit the progression to end stage renal disease (ESRD) [11,12].

Hypertension is two times as prevalent in patients with diabetes compared to the general population with mean blood pressure rising by 5–8% a year in patients with overt nephropathy, a condition affecting 25% of type 2 diabetic patients [13].

Therefore, the aim of the study was to locate the levels of Glucagon-Like Peptide-1 and Dipeptidyl Peptidase-4 in diabetic nephropathy patients and compare the results with controls.

**MATERIALS AND METHOD**

Sixty individuals, with age range of 45-60 years and BMI of 29 Kg/m² or less, were enrolled in this study. They were divided into two groups as follows: control group (G1) consisted of 30 healthy subjects and the group of diabetic nephropathy (G2) consisted of 30 patients. Blood samples were collected from the two groups after a period of 12-14 hours fasting. The study was conducted between April 2015 and September 2015 in the diabetic and endocrinology center in Al-Sadder Medical City/ Iraq. Whole blood was used for determination of HbA₁C. Serum was obtained from other part of blood that used in determination of FBG, Albumin, Urea, Creatinine, TC, TG, HDL-c, GLP-1 and DPP-4. HbA₁C was determined in whole blood by kit that was produced by (Stanbio, USA). Glycoohemoglobin consists gradually and irreversibly in red blood cells during his lifetime for a period of 120 days and by using this measurement kit the membranes of erythrocytes are break down and edit hemoglobin associated with glucose and measure its quantity [14]. Serum glucose was measured by using kits from (Randox Company, United Kingdom) which based on the PAP enzymatic determination of glucose [15]. Similarly serum urea was measured by using kits from (BioSystems S.A. Spain) which based on the Berthelot’s method [16]. While serum creatinine was measured by using kits from (BioSystems S.A. Spain) which is based on the alkaline Jaffe’s Picrate method [17]. Serum albumin was measured by using kits from (BIOLABO SA, Maizy, France) which is based on the BCG Method [18]. Total cholesterol [19], triglyceride [20], and HDL-c [21] were measured by enzymatic method from (Human Gesellschaft für biochemica and Diagnostica mbH, Germany). The levels of low-density lipoprotein-cholesterol and very low density lipoprotein-cholesterol were analyzed by using Friedewald equation as [22].

Serum VLDL-C can be obtained by:

The GLP-1 determined by using ELISA kit produced from (Elabscience, China), the measurement is based on sandwich principle and the levels of this hormone can be measured according to the procedure along with kit, The Dipeptidyl Peptidase-4 was estimated using ELISA kit produced from (Cloud-clone Corp. Wuhan USCN Business Co. Ltd, USA).

**STATISTICAL ANALYSIS**

The results are expressed as mean ± SEM. Student
`t`-test was used to compare the significance of the variation between diabetic nephropathy patient’s and control groups. P- Value with (P≤0.0001) considered statistically significant.

**RESULTS**

Table (1) displays the results of FBG, HbA1$_c$, GLP-1 and DPP-4 levels for the two studied groups. The results showed significant elevation in FBG, HbA1$_c$, GLP-1 and DPP-4 levels in patients as compared to control group.

Table 1 Comparison of some parameters between patients and control groups

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control group</th>
<th>Patients group</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBG (mg/dL)</td>
<td>92.53±1.87</td>
<td>271.47±19.49</td>
<td>S*</td>
</tr>
<tr>
<td>HbA$_c$ (%)</td>
<td>4.81±0.10</td>
<td>8.33±0.31</td>
<td>S</td>
</tr>
<tr>
<td>GLP-1 (ng/mL)</td>
<td>1.10±0.11</td>
<td>2.46±0.19</td>
<td>S</td>
</tr>
<tr>
<td>DPP-4 (ng/mL)</td>
<td>22.51±1.25</td>
<td>119.17±7.49</td>
<td>S</td>
</tr>
</tbody>
</table>

*S: Considered significant (P≤0.0001).

Table (2) presents lipid profiles for the two studied groups. Results revealed significant increase in TC, TG, LDL-c and VLDL-c levels in patients as compared to control group. Also, results revealed significant decrease in HDL-c levels in patients in comparison with controls.

Table 2 Lipid profiles for the two studied groups

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control group</th>
<th>Patients group</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC (mg/dL)</td>
<td>165.73±7.54</td>
<td>263.2±6.82</td>
<td>S*</td>
</tr>
<tr>
<td>TG (mg/dL)</td>
<td>149.80±6.21</td>
<td>221.4±8.40</td>
<td>S</td>
</tr>
<tr>
<td>HDL-c (mg/dL)</td>
<td>42.44±1.26</td>
<td>28.33±1.12</td>
<td>S</td>
</tr>
<tr>
<td>LDL-c (mg/dL)</td>
<td>93.13±7.88</td>
<td>190.59±7.91</td>
<td>S</td>
</tr>
<tr>
<td>VLDL-c (mg/dL)</td>
<td>29.96±1.24</td>
<td>44.28±1.68</td>
<td>S</td>
</tr>
</tbody>
</table>

*S: Considered significant (P≤0.0001).

Moreover, Table (3) presents levels of albumin, creatinine, urea and blood pressure for the two studied groups. Results revealed significant decrease in albumin levels in diabetic nephropathy group. In addition, the latter exhibited significant increase in creatinine, urea and blood pressure levels in comparison to control group.

Table 3 Creatinine, albumin, urea and blood pressure levels for the two studied groups

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control group</th>
<th>Patients group</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creatinine (mg/dL)</td>
<td>0.75±0.05</td>
<td>2.56±0.16</td>
<td>S*</td>
</tr>
<tr>
<td>Albumin (g/dL)</td>
<td>4.33±0.12</td>
<td>2.39±0.11</td>
<td>S</td>
</tr>
<tr>
<td>Urea (mg/dL)</td>
<td>27.85±1.67</td>
<td>65.22±4.76</td>
<td>S</td>
</tr>
<tr>
<td>Systolic BP/mmHg</td>
<td>116±1.63</td>
<td>169.3±4.92</td>
<td>S</td>
</tr>
<tr>
<td>Diastolic BP/mmHg</td>
<td>76±1.31</td>
<td>107.3±4.19</td>
<td>S</td>
</tr>
</tbody>
</table>

*S: Considered significant (P≤0.0001).

**DISCUSSION**

Diabetic Nephropathy (DN) is a serious complication of diabetes being strongly associated with increased cardiovascular mortality and end-stage renal disease\textsuperscript{[23]}. HbA1$_c$ is an important marker for monitoring the control of blood sugar over a long period of time and to move in parallel with complications caused by diabetes\textsuperscript{[24]}. As reported in many previous studies, this study also showed significant correlation between DN and FBS and HbA1$_c$\textsuperscript{[25]}. The kidney plays an important role in the secretion of incretin metabolites, GLP-1R agonists and DPP-4 inhibitors and, therefore, a special attention needs to be paid to the application of incretin-based therapy in renal impairment. Pre-clinical observations directly indicate renoprotective effects of incretin-based therapies in the development of hypertension and other defects of sodium detention in diabetic and nondiabetic nephropathy\textsuperscript{[26]}. Accumulation of GLP-1 causes pharmacological inhibition of DPP-4 that induced insulin excretion and contributes to the reduction of high
blood sugar after eating [5]. There was no previously published research estimated GLP-1 and DPP-4 levels in patients with diabetic nephropathy so as to be compared with this study.

Other studies have proposed the existence of a correlation between the progression of the disease towards renal impairment and hypercholesterolemia in type 2 diabetic patients [27,28]. In the present study the results (Table 2) were in agreement with those reported by Gall et al.[29] and Ravid et al.[30].

Some studies had shown that blood urea level is proportional to that of creatinine [31,32]. Current study showed a significant increase in urea, creatinine and blood pressure levels and significant decrease in albumin level with diabetes progressing towards glomerular injury. Similar findings were reported by other studies [33-36].

CONCLUSION

There was significant association between Diabetic Nephropathy and FBS, HbA1C, GLP-1, DPP-4, lipid profile, creatinine, urea and blood pressure levels. Also, There was significant decrease in albumin and high-density lipoprotein-cholesterol levels in diabetic nephropathy group as compared to control group.

Recommendations

Dipeptidyl peptidase-4 (DPP-4) inhibitors are often used worldwide reducing the level of glucose in the blood of patients with type 2 diabetes which stimulates the secretion of insulin and suppresses the secretion of glucagon. Currently, DPP-4 inhibitors (oral hypoglycemic drugs) are being integrated to treat type 2 diabetes. Nonetheless, there are many side effects of these drugs. So that, there is an urgent need to do more clinical studies in this field.

Ethical Clearance: Permissions for carrying out the study were obtained from the Research Ethics Committee at College of medicine/ University of Al-Nahrain/ Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

REFERENCES

11. Shlomo M, Polonsky KS, Larsen PR, Kronenberg HM. Diabetes Mellitus. Williams textbook of


Histopathological Changes in Testis Tissue Induced by Different Doses of Diclofenac Sodium in the Male Rats

Alaa shakir al-nahi¹, Afyaa sabah Nasir²

¹Department of Biology, Faculty of Sciences/University of Kufa, Najaf, Iraq,
²Department of Ecology, Faculty of Sciences/University of Kufa, Najaf, Iraq

SUMMARY

Background: Non-steroidal anti-inflammatory drugs (NSAIDs) are prominent amongst the most generally endorsed solutions for extensive variety of musclo-skeletal (MSK) tissue disorders. Additionally, different NSAIDs, apart from diclofenac, may cause gastrointestinal ulceration, extreme harm in testis, renal, liver tissues and serious hematological problems. The aim of current study was to study the influence of diclofenac sodium in the male rat fertility.

Method: This study involved 20 rats divided into four groups, each of five rats, as control and three active groups. The latter were treated with intramuscular diclofenac (50, 100 and 150mg/kg body weight) for 21 days.

Results: The results showed a significant (p<0.05) decrease in rats’ testes weights as compared with controls. In addition, testes from diclofenac-treated rats showed variable dose-dependent pathological changes that were revealed under light microscopy.

Conclusion: Pathologically testicles damage related with NSAIDs isn’t pervasive, however, we think it is interesting to report these findings for the recognition of the histopathological changes over the duration of diclofenac cytotoxicity.

Key words: Diclofenac sodium, male rats, testis, Sertoli cells, spermatogenesis, infertility.

INTRODUCTION

Non-steroidal anti-inflammatory drugs (NSAIDs) are prominent amongst the most generally endorsed solutions for extensive variety of musclo-skeletal (MSK) tissue disorders as they have settled calming and pain relieving properties. Application of these specialists goes in treatment of pain because of intense damage to the long haul interminable disorders, for example, osteoarthritis, rheumatoid joint pain, ankylosing spondylitis and comparative degenerative issue [1]. in addition, they are known to give symptomatic alleviation from pain, enable rapid convalescence and come back to typical activity.

Diclofenac is one of the most controlled NSAID recorded to have calming, pain relieving and antipyretic activities [2]. It assumes an imperative role in treating MSK disorders emerging from various etiological conditions; for example, rheumatoid joint pain, osteoarthritis and so forth. The system in charge of calming property is credited to the restraint of cyclooxygenase (COX) enzymes, in specific, COX-1 and COX-2 which diminish biosynthesis of prostaglandin (PG) at the irritation site [3].

Likewise, with any medication which has been utilized so broadly, various greatly uncommon or genuine unfriendly impacts have been related with diclofenac (advertised as Voltaren), Recent proof recommends that diclofenac digestion includes the creation of reactive oxygen species prompting oxidative pressure and genomic DNA discontinuity. Furthermore, there are signs that the mitochondrial inward flow and movement of caspases assume a pivotal part in the pathogenesis of diclofenac toxicity [4]. Moreover, broad utilization of diclofenac builds up the danger of intense myocardial infarction and a few instances of serious related responses associated with intramuscular infusion of diclofenac have been reported [5].

Additionally, different NSAIDs, apart from diclofenac, may cause gastrointestinal ulceration, extreme harm in testis, renal, liver tissues and serious hematological problems. Moreover, diclofenac is once in a while or never connected with some different genuine reactions caused by other ordinarily utilized NSAIDs, e.g. intense pancreatitis, aseptic meningitis, or serious cutaneous or phototoxic reactions [6].

DOI Number: 10.5958/0976-5506.2019.00401.7
Testis is an important organ in reproduction because responsible for production of sperms and hormones required for support of secondary sexual characteristics [7]. Foreign bodies, for example, drugs and other exogenous substances may intervene with biosynthesis, secretion, transport, biological activity or fate of hormones in charge of reproduction [8], in this way, upsetting spermatogenesis.

Presentation to fluctuating grouping of this endogenous mixture has, likewise, been accounted for the adverse effects on a few organs and modify a few barrier mechanisms in both animal and human models [9]. The aim of current study was to study the influence of diclofenac sodium in the male rat fertility.

**MATERIALS AND METHOD**

**Experimental Animals**

Twenty male rats weighing 250-300 grams were bought from Kufa University/Faculty of Sciences. The animals were kept up under institutionalized ecological conditions as ventilation, temperature (25-30°C), light cycle (12h light: 12h dark) and standard diet.

Twenty male rats weighing 390-405 grams were utilized as a part of this study. They were divided into four groups: one control and three diclofenac groups, each of 5 rats. The rats in the control group were intramuscularly injected with physiologic saline (1cc for every rodent). The rats in the other three groups were intramuscularly injected with 50, 100 and 150mg/kg live weight/day diclofenac sodium, separately. The study continued for 21 days individually. The experiment was terminated 24h after the last injections.

Every one of the rats was anesthesized after injection by the mixture of xylazine 0.1ml and ketamine 0.5ml [10] and tissue specimens were taken from the testes. The specimens were then settled in a supported formalin, handled through reviewed alcohols and xylene and installed in paraffin squares. Tissue areas of 4-6µ were made at different levels [11].

**Statistical analysis**

Results are presented as means ± SD. The weights for different variables were analyzed by one-way analysis of variance (ANOVA) [12].

**RESULTS**

Results showed significant decrease (P<0.05) in the body weight of all rats injection with diclofenac as compared with control rats (Table 1).

<table>
<thead>
<tr>
<th>Dose of Diclofenac (mg/kg)</th>
<th>Rats’ weight/g (Mean±SD) Before treatment</th>
<th>After treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>400±1.6</td>
<td>403.5±3.11</td>
</tr>
<tr>
<td>50</td>
<td>395±3.32</td>
<td>240 a ±4.08</td>
</tr>
<tr>
<td>100</td>
<td>390±4.20</td>
<td>307.5b ±6.45</td>
</tr>
<tr>
<td>150</td>
<td>401±3.99</td>
<td>344 c ±4.35</td>
</tr>
</tbody>
</table>

a, b and c mean significant differences (P<0.05) between diclofenac- treated and control rats.

In addition, the results showed significant decrease (P<0.05) in weight of testes between diclofenac-treated and control rats (Figure 1 and Table 2).

![Figure 1 Differences in rats’ testes weight between diclofenac-treated and control rats](image)

**Table 2 Differences in rats’ testes weight between diclofenac-treated and control rats**

<table>
<thead>
<tr>
<th>Dose of Diclofenac (mg/kg)</th>
<th>Rats’ testes weight/g (Mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>0.2694%b±1.518</td>
</tr>
<tr>
<td>100</td>
<td>0.1652% b±1.613</td>
</tr>
<tr>
<td>50</td>
<td>0.4355% a±1.985</td>
</tr>
<tr>
<td>Control</td>
<td>0.3548±5.283</td>
</tr>
</tbody>
</table>

a and c mean significant differences (P<0.05) between diclofenac-treated and control rats.

Light microscope examination revealed normal seminiferous tubules, normal lumen of seminiferous tubules and germinal layers and normal Interstitium
On the other hand, diclofenac-treated rats showed a range of pathological changes. Those treated with intramuscular diclofenac (50mg/kg) showed degenerative changes in seminiferous tubules and abnormal accumulation of spermatid, no germinal layer and reflect of spermatids downward to the wall of seminiferous tubules (Figure 3). Moreover, sections from testes of rats treated with intramuscular diclofenac (100mg/kg) show more extensive toxicological features including shrinkage in seminiferous tubules and increased spaces among them (Figure 4). Furthermore, testes of rats treated with intramuscular diclofenac (150mg/kg) showed degeneration of germinal layer and vaculation between spermatogonia (Figure 5).

**DISCUSSION**

The testis is thought to be the most vital organ in male reproductive system. It is characterised by two fundamental functions; biosynthesis of steroid hormones and production of spermatozoa [13]. Testis is made out of seminiferous tubules and interstitial tissues. The procedure of spermatogenesis takes place inside the seminiferous tubules under the influence of testosterone [14]. Either a diminished length of seminiferous tubules or a diminished thickness of components inside a given length including diminished thickness because of degeneration of spermatogenic components would influence testicles weight and diminished length of seminiferous tubules. This suggests either less spermatogonial under developed cells or a lower mitotic movement of these undifferentiated organelles [15].

These facts strengthen our findings about diminishing testicular weight. Testis weight is associated with fertility in light of the fact that bigger testicular weight has been associated with an expansion in every day sperms generation. On the other hand, small testis is associated with poorer fertility due to less number of sperms production [16]. Diminished testicular weight implies diminished length of seminiferous tubules which are the essential sites for spermatogenesis. Seminiferous tubules are the sites for spermatogenesis and they contain three sorts of cells: male germ cells, Sertoli cells,
and Myoid cells, while Leydig cell are situated between neighboring seminiferous tubules [17].

As per formative movement at the base of the seminiferous tubules have spermatogonia, spermatocytes in the center, and spermatids close to the peak of the seminiferous epithelium. In the current study, the treated rats with diclofenac caused degeneration, cytological and tiny degenerative changes in seminiferous tubules prompting shrinkage of seminiferous tubules came about reduction in number of Sertoli cell, Leydig cells, primary spermatogonia, secondary spermatogonia and spermatocytes [18]. These findings indicated he degenerative effects of diclofenac sodium upon rat testicles. In seminiferous tubules Sertoli cells are the most imperative cell in light of the fact that germ cells expansion rely upon them, as they provide the sustenance for development of germ cells. In addition, Sertoli cells are concerned with the arrival of spermatids into the seminiferous tubules’ lumen and controlling the testicular vasculature [19].

Diminished number of Sertoli cell will cause diminished number of germ cells as the former provide nutrition for germ cells and the surrounding conditions optimal for normal development [20]. The aggravation of storm cellular layer of seminiferous tubules in this way has influence on oxygen, sustenance and hormonal transport [22]. The over articulation of collagen IV strands that cause thickening of seminiferous tubules are connected with dysfunctional spermatogenesis since the collagen IV filaments are emitted by Sertoli cells [22]. The present findings demonstrated that treatment with diclofenac sodium affected Leydig cells and interstitium as degeneration, vaculation putrefaction and fibrosis-like appearance were appeared in Leydig cells and interstitium. In ordinary testicular activity, Leydig cells are the focal point of maturity control and reproductive wellbeing by delivering testosterone [23]. Sperm development is a mind boggling procedure and PG play a critical role in controlling luminal conditions [24].

Additionally, there is a connection between Leydig cells and veins proposed that these cells are at high danger of exogenous toxicants [25]. The degeneration of Sertoli cells and expanded intercellular space between germ cells, the sloughing of the germ cells and accumulation in the lumen of seminiferous tubules were because of abnormalities in the function and structure of Sertoli cells. Sertoli cells unsettling influences rapid lose of germ cells and finally rapid aggravation of testicular tissue [26]. Sertoli cells have likewise an essential role in the improvement of the germ cells by shaping testicular blood obstruction that ensures germ cells and by supply nutrients and hormones to germ cells [27].

In conclusion, pathologically testicles damage related with NSAIDs isn’t pervasive, however, we think it is interesting to report these findings for the recognition of the histopathological changes over the duration of diclofenac cytotoxicity.

**Ethical Clearance:** Permissions for carrying out the study were obtained from the Research Ethics Committee at Faculty of Sciences/University of Kufa, Najaf, Iraq.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**REFERENCES**


Evaluation of Antimicrobial Activity of the Aquatic Extracts of Zea Mays, Cranberries and Raisins against Bacterial isolates from Urinary Tract Infection in Babylon Province, Iraq

Mohammed Abdul-Hassan AL-Zobaidy¹, Mays Hadi Jebur², Nada Khazal Kadhim Hindi³

¹Department of Basic Medical Sciences/ College of Nursing/ University of AL-Qadisiyah, Iraq, ²Basic and Medical science Department, College of Nursing, University of Babylon, ³Basic and Medical science Department, College of Nursing, University of Babylon

ABSTRACT

Background: Urinary tract infection costs hundreds millions of dollars every year. In addition, causative bacterial species are diverse and some of them are multi-drug resistant. Objectives: evaluating the effects of aqueous extracts of Zea Mays, Cranberry and Raisins on growth, adherence and biofilm formation of bacterial uropathogens isolated from clinical urinary tract infections. Method: The extracts of Zea Mays, Cranberry and Raisins were prepared as 30 gram of powder soaked in 100 ml distilled water, allowed to stand for 72 hr and sterilized by filtration. Bacterial isolates were obtained from urinary tract infection clinical samples. Agar well diffusion assay, tissue culture plate method assay and bacterial ability to adhere to oral epithelial cells used to evaluate effects of these extracts on growth, motility, adhesion and biofilm formation in bacterial isolates. Results: the aqueous extracts of Zea Mays, Cranberry and Raisins, individually and in combination, have significant inhibitory effects on growth, motility, adherence and biofilm formation in the bacterial isolates considered in current study. In addition, combinations that contain Zea Mays exerted more powerful antibacterial effects than other combinations. Conclusions: plant extracts considered in current study may provide useful substitutes for commonly utilised antibiotics for treatment of urinary tract infections, especially recurrent cases. However, the exact mechanisms and the active ingredients responsible for the reported antibacterial effects need further exploration and specification. In addition, further studies at the molecular level and/ or in vivo studies involving humans and animals are needed to confirm the observed effects of these plant extracts.

Keywords: Zea Mays, Cranberry, Raisins, adherence, biofilm, uropathogens.

INTRODUCTION

Urinary tract infection (UTI) is a prevalent bacterial disease as it is associated with approximately two million of cases worldwide (1). It mostly affects male infants, women of various age groups and elderly men (2). Also, inadequate treatment of UTI results in serious complications like recurrent infection, septicemia and renal dysfunction.

Causative micro-organisms of UTI (uropathogens) include both Gram-positive and Gram-negative bacteria and some fungal species (3,4). The initial step in the pathogenesis of UTI is adherence of uropathogens to lining epithelium of urinary tract (uroepithelium) via flegallae and pili (2).

Moreover, uropathogens may implement phenotypic alterations such as “filamentation” to resist killing by host neutrophiles and achieve progressive colonization of uroepithelium (5).

It is well-recognized that UTI can cause significant financial and health troubles for the patient, family and the community, therefore, effective treatment is a priority at the individual, organizational and governmental levels (6). Commonly prescribed antibiotics for treatment of UTI include trimethoprim, sulfamethoxazole, ciprofloxacin and ampicillin (7). However, the demand for alternative therapeutics is increasing. The latter must be inexpensive, effective against resistant uropathogens and without affecting vaginal and intestinal flora.
Also, these potential therapies should target the virulence elements of concerned uropathogens. In this regard, numerous studies have evaluated the potential antimicrobial properties of plants against a wide range of bacterial isolates, especially those responsible for urinary tract infections. These plants have been shown to be inexpensive, have wide therapeutic window and have few unwanted effects compared to standard antibiotics.

One of these plants is *Zea Mays*. Its aqueous extract contains phenols, flavanoids, tannins, saponins, alkaloids and cardiac glycosides whereas its alcoholic (methanol) extract contains also terpenoids and anthraquinones. Also, *Zea Mays* hairs have been successfully employed in the treatment of DM, immunological, proliferative and renal diseases.

Previous studies reported antibacterial properties of raisins and raisin products. For example, there was 99.99% inhibition of *Salmonella typhi*, *Escherichia coli O137:H7* and *Listeria monocytogenes* growth following 18 and 8 days incubation with finished raisins and raisin juice, respectively. Also, raisins contain phytochemicals with antibacterial properties.

The objective of current *in vitro* study was to evaluate antibacterial effects of aqueous extracts of *Zea Mays*, Cranberry and Raisins on bacterial uropathogens, individually and in combination.

**MATERIAL AND METHOD**

1. **Aqueous extracts:** Preparation of Aqueous Extract of plants according to.

2. **Bacterial Isolates**

A total of 8 Gram negative, and 3 Gram positive isolates were isolated from UTI samples were used in this study. The bacterial isolates represented by; *S. aureus*, *S.epidermidis*, *S. saprophyticus*, *P.aeruginosa*, *P. fluorescens*, *E. coli*, *E.aerogenes*, *K. pneumoniae*, *Proteus mirabilis*, *P.vulgaris*, *Acinetobacter*. These bacteria were activated and cloned three successive times in nutrient agar and stored on nutrient agar slant at 4 °C. The identification of these organisms was confirmed by using conventional biochemical tests.

3. **Antimicrobial activity test by Agar-well diffusion assay (In vitro)**

According to Forbes, the antimicrobial activity of ciprofloxacin was determined by agar disc diffusion (the plates were performed in triplicates).

4. **Biofilm Formation Assay:** Semi quantitative micro-tier plate test or Tissue culture plate method assay (TCP) designated by Christensen et al. was assumed as the gold standard test to detect biofilm formation (table 1).

5. **Adherence test:** Bacterial adherence to oral epithelial cell can be identified using method designated by (table 1).

6. **Inhibition of motility (swarming) by plant extract:**

Plant extract was added separately in concentrations of (10%, 20%, 30%).

All the extracts involved in this study were used in each tests to detect the antibacterial properties of these extracts separately (the plates were performed in triplicates).

**Table (1) Classification of bacterial adherence and biofilm formation by TCP method**

<table>
<thead>
<tr>
<th>Mean of OD value at 630nm</th>
<th>Adherence</th>
<th>Biofilms formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.120</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>0.120-0.240</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>&gt;0.240</td>
<td>Strong</td>
<td>High</td>
</tr>
</tbody>
</table>

**DATA ANALYSIS**

Data were expressed as Mean±SE and presented using descriptive statistics. Independent t-tests and one-way Analyses of Variance (ANOVA), followed by Bonferroni multiple comparison test, were used for comparisons between variables. Probability values less than .05 were considered statistically significant.

**RESULTS**

Current study showed that the individual aqueous extracts of *Zea Mays*, Cranberry and Raisins exerted powerful anti-growth effects on Gram-positive and Gram-negative bacterial uropathogens as compared to the standard antibiotic; Ciprofloxacin (Figures 1-3). Also, compared to Ciprofloxacin, Gram-negative isolates were more sensitive to current extracts than were Gram-
positive isolates (P<0.001 and <0.05, respectively; Table 1).

The salient finding of current study was that combinations of two or more extracts produced more significant anti-growth activities than those of corresponding single extracts (Figures 1-4; Tables 1-2) and those of Ciprofloxacin (Figures 4-6). Interestingly, combinations contained Zea Mays produced more powerful anti-growth effects than other combinations (Table 2).

Moreover, aqueous extracts of Zea Mays, Cranberry and Raisins exerted powerful anti-adherence and anti-biofilm properties on Gram-negative isolates of interest. The former two extracts were more powerful than Raisins (Table 3).

**DISCUSSION**

Previous studies reported that cranberry extracts exerted significant inhibitory effects on the growth of specific isolated uropathogens (21). For example, results of a retrospective study (22) reported that cranberries exerted significant antibacterial effects against antibiotic-responsive and antibiotic-resistant bacterial uropathogens. In addition, (23) reported that cranberries contain two components that inhibited adhesion of E. coli; one of them inhibited mannose-susceptible fimbrial component and the other blocked mannose-resistant element of adhesion in E. coli. Also, (24) reported effective inhibition of biofilm formation in bacterial uropathogens by cranberries.

The reported antibacterial activities of cranberries could be attributed to their contents of hipauric acid and phytochemicals like flavanoids, production of nitric oxide and/ or presence of specific anti-adhesion ingredients (25-28).

On the other hand, other researchers (29) stated that Zea Mays was useful for treatment of recurrent nephritis and cystitis. The reported antibacterial activities of Zea Mays could be attributed to its contents of flavonoids, tannins, saponnins, phenols and cyclic hydroxamic acids (30). The latter are lethal for bacteria, fungi and insects (31).

Furthermore, previous studies revealed reported powerful antimicrobial activities of raisins against a wide spectrum of pathogenic micro-organisms. For example, adding raisin products to meats and bread had prevented their rancidity without having unwanted sensory effects (32). Also, both skin and meat of raisins exhibit effective antibacterial properties whether independently or in combination (33).

The documented antibacterial properties of raisins could be attributed to their acidic pH (3.5-4), their dryness and presence of phytochemicals like acid-active phenolic acid and oleanolic acid (34,35). The latter has anti-adherence and anti-biofilm formation against cariogenic *Staphylococcus mutans* (36,37).

The highly significant inhibition of bacterial growth reported in current study, following the use of combinations of two or more extracts, could be attributed to the possibility that these extracts have different mechanisms of actions against the selected uropathogens (38).

**CONCLUSIONS**

Plant extracts studied in current study, individually or in combinations, may provide useful substitutes for synthetic antibiotics for treatment of urinary tract infections, especially recurrent cases. However, further studies are required to explore the exact pharmacokinetics and pharmacodynamics of these plants, maybe at the molecular level and/ or in vivo studies involving humans and animals.

**Ethical Clearance :** This study was approved by the ethical committee of scientific research according to ministry higher edcation and sintifc research in Iraq, also according to biosafty low of good lab.potection .

**Source of Funding:** self-fund

**Conflict of Interest:** the authors declare that they have no conflict of interest.
Figure (1): Antibacterial activity of white Raisins against bacterial isolates

Figure (2): Antibacterial activity of Cranberry against bacterial isolates

Figure (3): Antibacterial activity of Zea Mays against bacterial isolates
Figure (4): Antibacterial activity of white Raisins and Cranberry against bacterial isolates

Figure (5): Antibacterial activity of Zea Mays and Cranberry against bacterial isolates

Figure (6): Antibacterial activity of Zea Mays, white Raisin and against bacterial isolates
Table (1) Effects of individual extracts of Raisins, Cranberry and Zea Mays on growth of G⁺ve and G⁻ve bacterial uropathogens

<table>
<thead>
<tr>
<th>Extracts</th>
<th>Zone of inhibition (Mean±SE) / mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G⁺ve (n=3)</td>
</tr>
<tr>
<td></td>
<td>G⁻ve (n=8)</td>
</tr>
<tr>
<td>Raisins</td>
<td>22.3 ± 1.5*</td>
</tr>
<tr>
<td></td>
<td>21.6 ± 0.8**</td>
</tr>
<tr>
<td>Cranberry</td>
<td>24.0 ± 1*</td>
</tr>
<tr>
<td></td>
<td>24.4 ± 1.1**</td>
</tr>
<tr>
<td>Zea Mays</td>
<td>25.3 ± 2.6*</td>
</tr>
<tr>
<td></td>
<td>26.4 ± 0.7**</td>
</tr>
<tr>
<td>Control (Ciprofloxacin)</td>
<td>17.3 ± 0.7</td>
</tr>
<tr>
<td></td>
<td>8.8 ± 1.9</td>
</tr>
</tbody>
</table>

* and ** Significant difference from ciprofloxacin (P≤0.05) and (P≤0.001), respectively.

Table (2) Effects of combinations of Raisins, Cranberry and Zea Mays extracts on growth of G⁺ve and G⁻ve bacterial uropathogens

<table>
<thead>
<tr>
<th>Extracts</th>
<th>Zone of inhibition (Mean±SE) / mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G⁺ve (n=3)</td>
</tr>
<tr>
<td></td>
<td>G⁻ve (n=8)</td>
</tr>
<tr>
<td>Raisins + Cranberry</td>
<td>30 ± 0.0***†</td>
</tr>
<tr>
<td></td>
<td>30.3 ± 0.6***††</td>
</tr>
<tr>
<td>Raisins + Zea Mays</td>
<td>34 ± 0.6***†††</td>
</tr>
<tr>
<td></td>
<td>34.5 ± 0.7***†††</td>
</tr>
<tr>
<td>Cranberry + Zea Mays</td>
<td>35.3 ± 0.3***†††</td>
</tr>
<tr>
<td></td>
<td>35.6 ± 0.6***†††</td>
</tr>
<tr>
<td>Raisins + Cranberry + Zea Mays</td>
<td>40.± 0.0***</td>
</tr>
<tr>
<td></td>
<td>39.8 ± 0.2***</td>
</tr>
<tr>
<td>Control (Ciprofloxacin)</td>
<td>17.3 ± 0.7</td>
</tr>
<tr>
<td></td>
<td>8.8 ± 1.9</td>
</tr>
</tbody>
</table>

*** Significant difference from ciprofloxacin (P<0.001).† Significant difference from other combinations (P<0.001).†† Significant difference from the combination of Raisins, Cranberry and Zea Mays (P<0.001).

Table (3) Anti-biofilm and anti-adherence activities of Zea Mays, white Raisin and Cranberry against G⁻ve bacteria

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Biofilm formation</th>
<th>Adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aquatic extract of white Raisin</td>
<td>Aquatic extract of Zea Mays</td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td>Moderate*</td>
<td>High**</td>
</tr>
<tr>
<td>P. fluorescens</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>P. vulgaris</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>P. mirabilis</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>K. pneumoniae</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>E. aerogenes</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Acinetobacter</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>E. coli</td>
<td>Moderate</td>
<td>High</td>
</tr>
</tbody>
</table>

*Moderately (0.120-0.240) **High (>0.240)
REFERENCES


23. Mulvey MA. Adhesion and entry of uropathogenic


ABSTRACT

We evaluated the correlations between serum s-adenosylhomocysteine, homocysteine, vitamin B6 and vitamin B12 with the severity of MI. S-adenosylhomocysteine, homocysteine, troponin, vitamin B6 and vitamin B12 from 90 acute myocardial infarction (AMI) and 120 controls were measured by ELISA technique (VIDIS for troponin), and the data were analyzed by SPSS software. The study subjects divided to four groups from onset of heart attack to blood collected into G1 group (in the same day), G2 group (in the second day), G3 group (in the third day) and G4 group (after the third day). The results of our study show a significant increase in s-adenosylhomocysteine in all groups in both males and females patients, and for troponin show a significant increase just in the first three the groups in both genders and for homocysteine shown a significant increase just in the first two the groups in both genders.

Keywords: Homocysteine, s-adenosylhomocysteine, Troponin, Myocardial Infarction.

INTRODUCTION

Myocardial infarction (MI), commonly known as a heart attack occurs when blood flow decreases or stops to a part of the heart, causing damage to the heart muscle. Most MIs occur due to coronary artery disease. Risk factors include high blood pressure, smoking, diabetes, lack of exercise, obesity, high blood cholesterol, poor diet, and excessive alcohol intake, among others. The complete blockage of a coronary artery caused by a rupture of an atherosclerotic plaque is usually the underlying mechanism of an MI. MIs are less commonly caused by coronary artery spasms, which may be due to cocaine, significant emotional stress, and extreme cold, among others. A number of tests are useful to help with diagnosis, including electrocardiograms (ECGs), blood tests, and coronary angiography. An ECG, which is a recording of the heart’s electrical activity, may confirm a segmented elevation myocardial infarction (STEMI) if ST elevation is present commonly used blood tests include troponin and less often creatine kinase MB used to diagnosis MI. Troponin or the troponin complex proteins (troponin C, troponin I, and troponin T) that is integral to muscle contraction in skeletal muscle and cardiac muscle, but not smooth muscle. Discussions of troponin often pertain to its functional characteristics and/or to its usefulness as a diagnostic marker or therapeutic target for various heart disorders in particular as a highly specific marker for myocardial infarction or heart muscle cell death.

METHODOLOGY

PATIENTS GROUP

Ninety patient diagnosed with acute myocardial infarction (45 male and 45 female).

CONTROL GROUP

Twenty eight healthy subject as control (66 male and 54 female).

DATA COLLECTION

Inclusion criteria

The myocardial infarction patients who was
diagnosed by the physicians of the center.

**Exclusion criteria**

The patients with renal failure, liver failure, Congestive heart disease and Patients who treated with vitamins B$_6$ and B$_{12}$.

**SAMPLE COLLECTION**

This study was achieved by collecting 88 blood samples included 210 persons (90 myocardial infarctions and 120 normal controls) and age between (35-65 years), with period of collection from 1/11/2017 to 15/1/2018 at Thi Qar Heart Center, Iraq Thi Qar Governorate.

**STATISTIC ANALYSIS**

Statistical analysis was performed by using (SPSS) version (20) and all data presented as mean ± SD used ANOVA and t test. (P> 0.05) was considered to be significant statistically.

**SUBJECTS**

Ninety patient diagnosed with acute myocardial infarction (45 male and 45 female) and one hundred twenty healthy subject as control (64 male and 56 female) And the patient divided into four group depending on onset of the heart attack and the blood collection time before treatment into; G1 group (in the first day 34 patient), G2 group (in the second day 26 patients), G3 group (in the third day 17 patients) and G4 group (after the third day 13 patients).

In the same those four groups the subjects subdivided according for type of AMI into STEMI (segmented elevation of myocardial infraction) and NSTEIM (non-segmented elevation myocardial infraction).

**RESULTS AND DISSCASION**

**Age distribution patient and control**

Distribution of ages between patients and the control group, which are presented in the (table 1), shows no significant differences in the age of the patients when compared with those of the control group (P <0.005).

**Homocystine of G1-group**

The results of our study which was presented in (the table 2) Show a significant increase (P< 0.05) in homocystine levels of MI male patients (1.76 ± 0.9 vs. 1.43 ± 1.0 µg/dl) and for females (1.74 ± 0.8 vs. 1.2 ± 1.0 µg/dl). We suggest this elevation in homocystine level may be due to the decreasing level of vitamin B$_6$ that inhibit cystathionine beta synthase enzyme and retarding homocystine from converting to cystathionine and then to the cysteine and excretion in urine as shown in the figure (1.1). Hao L et al 2007, A Bayır K et al 2011, and Yan M et al 2017 reported that the elevation in homocystine level is may be due to reduction of folic acid and vitamin B12 are two vital regulators in Hcy metabolic process 14 15 16. Other researchers reported that the elevation in homocystine level is may be due to serum vitamin A is a causal factor for homocysteine elevation in acute myocardial infarction 17 18, and may be due to increasing in lipoprotein (Lp a) in patient with AMI 19.

**S-adenosylhomocystine of G1-group**

The results of our study which was presented in the table 3.2 show also a significant increase (P< 0.05) in s-adenosylhomocystine levels of MI male patients (47.84±17.51 vs. 1.37±0.42 ng/dl) and for females (10.09±4.15 vs. 1.36±0.42 ng/dl). We suggest this elevation in s-adenosylhomocystine level is may be due to the increasing level of homocystine that which in equilibrium with adenosylhomocystine (the more stable form) or may due to convert methionine (that come from diet or from homocystine feedback by activity of vitamin B$_{12}$) into adenosylhomocystine. As shown in the figure (1.1). Yunjun Xiao et al 2013 reported that the elevation of s-adenosylhomocystine may be due to decrease the concentration of serum folate 20 and in other study; reported that elevation of s-adenosylhomocystine may due to low dietary choline lowers methionine formation and causes a marked increase in S-adenosylmethionine utilization in the liver 21.

**Troponin of G1 group**

As in the previous two sections, the troponin level in our study, which was presenting in (the table 3.2) show a significant increase (P< 0.05) of MI male patients (9.05 ± 1.3 vs. 0.15 ± 0.00 µg/dl) and for females (1.75 ± 1.63 vs. 0.15 ± 0.00 µg/dl). We suggest this elevation in troponin level may due to a necrosis of the cardiac cell which prevents troponin from attaching tropomyosin and do not lies within the groove between actin filaments in muscle tissue , so it releases in the blood stream.
elevation in troponin level in AMI patient may be due to the damaged area in the heart muscle.\textsuperscript{22, 23}

**Vitamin B\textsubscript{6} of G1-group**

The results of our study which was presenting in the table 3.2 clearly shown a significant decrease (\(P< 0.05\)) in vitamin B\textsubscript{6} levels of MI male patients (5.07 ± 1.5 vs. 10.36 ± 1.99 ng/dl) and for females (5.36 ± 2.26 vs. 9.81 ± 1.91 ng/dl).

**Vitamin B\textsubscript{12} of G1-group**

The results of our study which was presenting in the table 3.2, show a significant increase (within the normal value) (\(P< 0.05\)) in vitamin B\textsubscript{12} levels of MI male patients (156.6 ± 121.7 vs. 128.0 ± 49.4 ng/dl) and for females (189.3 ± 95.1 vs. 139.7 ± 61.8 ng/dl).

**Clinical and biochemical characteristics of G2 group.**

**Homocysteine of G2 group**

G2 group results of our study that presented in the table 3.3, this results showed a significant increase (\(P< 0.05\)) in homocysteine levels of MI male patients (1.85 ± 0.4 vs. 1.43 ± 1.0 µg/dl) and for females (1.64 ± 0.6 vs. 1.2 ± 1.0 µg/dl).

**S-adenosylhomocysteine results in G2**

The results of our study which was presented in the table 3.2 showed also a significant increase (\(P< 0.05\)) in s-adenosylhomocysteine levels of MI male patients (8.64 ± 4.77 vs. 1.37±0.42 ng/dl) and for females (10.71 ± 3.97 vs. 1.36 ± 0.42 ng/dl).

**Troponin of G2-group**

As G1, troponin that presented in (the table 3.2) showed a significant increase (\(P< 0.05\)) of MI male patients (7.65 ± 3.4 vs. 0.15 ± 0.00 µg/dl) and for females (2.09 ± 6.9 vs. 0.15 ± 0.00 µg/dl).

**Vitamin B\textsubscript{6} of G2 group**

The results of our study which was presented in the table 3.3 clearly shown a significant decrease (\(P< 0.05\)) in vitamin B\textsubscript{6} levels of MI male patients (5.64± 1.61 vs. 10.36 ± 1.99 ng/dl) and for females (4.60± 1.51vs. 9.81 ± 1.91 ng/dl).

**Homocysteine of G3 group**

In contrast to the previous two groups, the results of our study which was presented in the table 3.4 that shown no significant differences (\(P< 0.05\)) in homocysteine levels of MI male patients (1.35 ± 0.5 vs. 1.43 ± 1.0 µg/dl) and (1.51 ± 1.3 vs. 1.2 ± 1.0 µg/dl) for females. Actually; we did not pronounced any study during achievement of this research had four groups' similar periods of this study.

**S-adenosylhomocysteine of G3 group**

The results of our study which was presented in (the table 3.4), show no significant differences (\(P< 0.05\)) in s-adenosylhomocysteine levels of MI male patients (11.20± 5.62 vs. 1.37±0.42 ng/dl) and for females (9.00 ± 4.96 vs. 1.36 ± 0.42 ng/dl).

**Troponin of G3 group**

As in the previous two groups (G1 and G2), troponin that presented in (the table 3.4) show a significant increase (\(P< 0.05\)) of MI male patients (2.21 ± 2.2 vs. 0.15 ± 0.00 µg/dl) and for females (19.78 ± 9.5 vs. 0.15 ± 0.00 µg/dl).

**Vitamin B\textsubscript{6} of G3 group**

The results of our study which was presented in the table 3.4 clearly given a significant decrease (\(P< 0.05\)) in vitamin B\textsubscript{6} levels of MI male patients (4.38± 0.48 vs. 10.36 ± 1.99 ng/dl) and for females (5.64± 1.61vs. 9.81 ± 1.91 ng/dl).

**Vitamin B\textsubscript{12} of G3 group**

The results of our study that presented in (the table 3.4), show no significant differences (\(P< 0.05\)) in vitamin B\textsubscript{12} levels of MI male patients (138.3 ± 123.7 vs. 128.0 ± 49.4 ng/dl) and (149.2 ± 33.2 vs. 117.3 ±108.1 ng/dl) for females.
Table 1: Age’s distribution between patients and controls according to four groups.

<table>
<thead>
<tr>
<th>Periods</th>
<th>Gender</th>
<th>Control</th>
<th>Patient</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean + SD</td>
<td>Range</td>
<td>Mean + SD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First day</td>
<td>Male</td>
<td>54.433 ± 9.91</td>
<td>44-64</td>
<td>55.208±13.12</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>57.513 ± 8.67</td>
<td>48-66</td>
<td>56.423±6.78</td>
</tr>
<tr>
<td>Second day</td>
<td>Male</td>
<td>53.631±5.45</td>
<td>47-58</td>
<td>54.631±9.91</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>56.191±6.23</td>
<td>50-62</td>
<td>55.761±4.54</td>
</tr>
<tr>
<td>Third day</td>
<td>Male</td>
<td>54.484±4.39</td>
<td>50-59</td>
<td>56.638±5.55</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>55.561±5.31</td>
<td>50-60</td>
<td>52.981±3.31</td>
</tr>
<tr>
<td>Over third day</td>
<td>Male</td>
<td>58.132±7.99</td>
<td>50-65</td>
<td>57.741±5.53</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>52.534±2.91</td>
<td>49-55</td>
<td>53.366±2.26</td>
</tr>
</tbody>
</table>

Table 2. Clinical and biochemical characteristics of study subject, Homocysteine, adenosylhomocystine, troponin, B6 and B12 between patients and controls of G1.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Gender</th>
<th>Control</th>
<th>Patient</th>
<th>L.S.D</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean + SD</td>
<td>No.</td>
<td>Mean + SD</td>
<td>No.</td>
</tr>
<tr>
<td>Homocysteine µg/dl</td>
<td>Male</td>
<td>1.42 ± 1.03ⁿ</td>
<td>66</td>
<td>1.75 ± 0.93ⁿ</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.20 ± 1.05ⁿ</td>
<td>54</td>
<td>1.74 ± 0.82ⁿ</td>
<td>18</td>
</tr>
<tr>
<td>Adenosyl-homocystine ng/dl</td>
<td>Male</td>
<td>1.37± 0.42ⁿ</td>
<td>66</td>
<td>47.84±17.51ⁿ</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.36± 0.42ⁿ</td>
<td>54</td>
<td>10.09± 4.15ⁿ</td>
<td>18</td>
</tr>
<tr>
<td>Troponin µg/dl</td>
<td>Male</td>
<td>0.015 ± 0.00ⁿ</td>
<td>66</td>
<td>9.05 ± 13.8ⁿ</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0.015 ± 0.00ⁿ</td>
<td>54</td>
<td>17.54 ± 16.3ⁿ</td>
<td>18</td>
</tr>
<tr>
<td>Vit. B₆ ng/dl</td>
<td>Male</td>
<td>10.36 ± 1.99ⁿ</td>
<td>66</td>
<td>5.07 ± 1.51ⁿ</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>9.81 ± 1.91ⁿ</td>
<td>54</td>
<td>5.36 ± 2.26ⁿ</td>
<td>18</td>
</tr>
<tr>
<td>Vit. B₁₂ ng/dl</td>
<td>Male</td>
<td>128.03 ± 49.3ⁿ</td>
<td>66</td>
<td>156.63 ± 121.7ⁿ</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>139.71 ± 61.8ⁿ</td>
<td>54</td>
<td>189.31 ± 95.1ⁿ</td>
<td>18</td>
</tr>
</tbody>
</table>
Table 3. Clinical and biochemical characteristics of study subject, Homocysteine, adenosylhomocysteine, troponin, B6 and B12 between patients and controls at G2.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Gender</th>
<th>Control</th>
<th>Patient</th>
<th>L.S.D</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean + SD</td>
<td>N</td>
<td>Mean + SD</td>
<td>N</td>
</tr>
<tr>
<td>Homocystine µg/dl</td>
<td>Male</td>
<td>1.42 ± 1.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>66</td>
<td>1.85 ± 0.41&lt;sup&gt;a&lt;/sup&gt;</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.20 ± 1.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>54</td>
<td>1.64 ± 0.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>12</td>
</tr>
<tr>
<td>Adenosylhomocysteine ng/dl</td>
<td>Male</td>
<td>1.37 ± 0.42&lt;sup&gt;b&lt;/sup&gt;</td>
<td>66</td>
<td>8.64 ± 4.77&lt;sup&gt;a&lt;/sup&gt;</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.36 ± 0.42&lt;sup&gt;b&lt;/sup&gt;</td>
<td>54</td>
<td>10.71 ± 3.97&lt;sup&gt;a&lt;/sup&gt;</td>
<td>12</td>
</tr>
<tr>
<td>Troponin µg/dl</td>
<td>Male</td>
<td>0.15 ± 0.00&lt;sup&gt;b&lt;/sup&gt;</td>
<td>66</td>
<td>7.65 ± 3.4a</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0.15 ± 0.00&lt;sup&gt;b&lt;/sup&gt;</td>
<td>54</td>
<td>20.91 ± 6.9a</td>
<td>12</td>
</tr>
<tr>
<td>Vit. B6 ng/dl</td>
<td>Male</td>
<td>10.36 ± 1.99&lt;sup&gt;a&lt;/sup&gt;</td>
<td>66</td>
<td>5.64 ± 1.61b</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>9.81 ± 1.91&lt;sup&gt;a&lt;/sup&gt;</td>
<td>54</td>
<td>4.60 ± 1.51b</td>
<td>12</td>
</tr>
<tr>
<td>Vit.B12 ng/dl</td>
<td>Male</td>
<td>128.03 ± 49.3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>66</td>
<td>174.1 ± 62.9a</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>139.7 ± 61.8&lt;sup&gt;a&lt;/sup&gt;</td>
<td>54</td>
<td>149.2 ± 33.2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 4. Clinical and biochemical characteristics of study subject, Homocysteine, adenosylhomocysteine, troponin, B<sub>6</sub> and B<sub>12</sub> between patients and controls at G3.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Gender</th>
<th>Control</th>
<th>Patient</th>
<th>L.S.D</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean + SD</td>
<td>N</td>
<td>Mean + SD</td>
<td>N</td>
</tr>
<tr>
<td>Homocysteine µg/dl</td>
<td>Male</td>
<td>1.42 ± 1.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>66</td>
<td>1.35 ± 0.5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.20 ± 1.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>54</td>
<td>1.51 ± 1.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8</td>
</tr>
<tr>
<td>Adenosylhomocysteine ng/dl</td>
<td>Male</td>
<td>1.37 ± 0.42&lt;sup&gt;b&lt;/sup&gt;</td>
<td>66</td>
<td>11.20 ± 5.62&lt;sup&gt;a&lt;/sup&gt;</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.36 ± 0.42&lt;sup&gt;b&lt;/sup&gt;</td>
<td>54</td>
<td>9.00 ± 4.96&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8</td>
</tr>
<tr>
<td>Troponin µg/dl</td>
<td>Male</td>
<td>0.15 ± 0.00&lt;sup&gt;b&lt;/sup&gt;</td>
<td>66</td>
<td>22.1 ± 2.2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0.15 ± 0.00&lt;sup&gt;b&lt;/sup&gt;</td>
<td>54</td>
<td>19.78 ± 9.5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8</td>
</tr>
</tbody>
</table>
**CONCLUSION**

S-adenosylhomocysteine is the best myocardial infraction marker more than homocysteine and troponin in all the time of the heart attack. The severity of the disease represented by s-adenosylhomocysteine levels is correlated with homocysteine, vitamin B6, fasting blood sugar, fasting cholesterol, fasting tri-glyceride, high density lipoprotein, low density lipoprotein, very low density lipoprotein levels, cigarette smoking and body mass index. There is a correlation between homocysteine, s-adenosylhomocysteine and troponin levels, between the segmented elevation of myocardial infraction (STEMI) and the non-segmented elevation of myocardial infraction (NSTEMI) patients. Vitamin B6 play an important role in accumulation of s-adenosylhomocysteine more than vitamin B12 that do not impact. High elevation of troponin levels associated more with NSTEMI patients compared to STEMI patients. Increase number of cigarettes smoking per a day is associated with severity of AMI disease. High level of body mass index is associated with severity of AMI disease.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Thi Qar health directorate, Al haboby Educational Hospital, Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**


7. Marcelina Parra, Seth Stahl and Hanjo Hellmann.” Vitamin B6 and Its Role in Cell Metabolism and Physiology. Cells, 7(7), 84.


Blood Pressure and Heart Rate monitoring for 40 Hours in a Sample of Iraqi adult Hypertensive Patients: a Cross Sectional Study

Wisam Hatif Kareem Al-Muramdy
Physician, Department of Medicine, Al-Diwaniyah Teaching Hospital, Al-Diwaniyah Province, Iraq

ABSTRACT

One of the major risk factors involved in ischemic heart diseases (IHD) and cerebrovascular accidents (CVA) is hypertension. The association between hypertension and mortality and morbidity form IHD, CVA and vascular disorders is evidenced by the vast majority of epidemiological studies and has gained worldwide acceptance. Method of labeling a patient as being hypertensive should be precise with avoidance of factors that may give false positive results such as anxiety accompanying single office readings. Aim of the study: to evaluate the trend of changes in mean blood pressure and heart rate during 40 hours of follow up in hypertensive adults. The study was a cross sectional study. Sample of patients was based on random sample selection method, in which random numbers were generated by computer and then applied to the available records of hypertensive patients visiting the medicine consultation clinic in Al-Diwaniyah teaching hospital. We were able to include 110 patients. The ABPM recordings were programmed to perform a BP measurement every 2 hours and data were considered adequate when 20 measurements were recorded during the 48 period of follow up.

Keywords: blood pressure, monitoring, hypertension.

INTRODUCTION

One of the major risk factors involved in ischemic heart diseases (IHD) and cerebrovascular accidents (CVA) is hypertension. The association between hypertension and mortality and morbidity form IHD, CVA and vascular disorders is evidenced by the vast majority of epidemiological studies and has gained worldwide acceptance. Moreover, strong evidence is clear that blood pressure control is an efficient way in reducing mortality related to IHD and CVA. Accompanying the increase in median life span of human being, is the appearance of a number of aging related disorders, of which the burden of hypertension has risen from 605 to 978 million. This has been reflected on the coast of health care, since the increase in number of hypertensive individuals in a community is associated with increase in the rate of hypertension related complications, such as IHD and CVA. In order to reduce the coast of health care allocated to morbidity accompanying long term hypertension, it is better to identify hypertensive individual as early as possible and manage them accordingly with aim of reducing to a lesser extent the complications arising in the setting of high systemic blood pressure. Evidence can be withdrawn from available published data that the best tool to assess blood pressure is the “24-hour blood pressure ambulatory monitoring (ABPM)”; this is in comparison with conventional BP measurement. Indeed, ABPM is the best way to highlight and predict hypertension associated mortality and morbidity events. A number of prospective studies have tested the predictive role of ABPM in comparison with conventional BP measurement, such as the “Dublin Outcome Study” and “the International Database of Ambulatory Blood Pressure in relation to Cardiovascular Outcome (IDACO)” in addition, the “CARDIORISC study” with a relatively large sample size of
hypertensive patients on treatment, and a long follow-up period of 4 years, and national guidelines such as “NICE 24,11 and CHEP 23, made a clear recommendation that the ABPM method is number one as a diagnostic way for hypertension. Indeed, the traditional way of assessing blood pressure is still in common use in governmental as well as private health care institutes in Iraq in spite of the documented inaccuracy of this conventional blood pressure assessment method 29. This fact and the available opportunity to assess 48-hour rather than 24-hour blood pressure ambulatory measurement added to the rarity of Iraqi literature dealing with this subject permitted the planning and conduction of the present study.

MATERIALS AND METHOD

The study was a cross sectional study. Sample of patients was based on random sample selection method, in which random numbers were generated by computer and then applied to the available records of hypertensive patients visiting the medicine consultation clinic in Al-Diwaniyah teaching hospital. We were able to include 110 patients. Verbal consent was obtained from each patient participating in the present study. The period of study extended from June 2017 through June 2018 and was carried out in Al-Diwaniyah teaching hospital, Al-Diwaniyah province, Iraq. The study was approved by the ethical approval committee of College of Medicine / University of Al-Qadisiyah. The inclusion criteria included every hypertensive patients already diagnosed and receiving regular pharmacological treatment for at least one year. The ABPM was performed during the patient’s normal workday. The ABPM monitors used in the study were adequately validated and calibrated according to international recommendations 27. The ABPM recorder used was (Meditec International England Ltd.). The ABPM recordings were programmed to perform a BP measurement every 2 hours and data were considered adequate when 20 measurements were recorded during the 48 period of follow up. Data were then transformed into an SPSS version 23 spread sheet and included age of patients, gender, systolic and diastolic blood pressure measurements and heart rate measurements.

RESULTS AND DISCUSSION

Tracing minimum and maximum systolic blood pressure, in patients, demonstrated obvious variation throughout the period of the study which extended for approximately 40 hour. Similarly, we found that tracing of minimum and maximum diastolic blood pressure and heart rate demonstrated obvious variation throughout the study. To figure out the changes in blood pressure and heart rate in patients as a group, we traced mean readings ± one standard deviation. It was shown that mean systolic blood pressure reading are relatively high at the beginning of data recording; however, readings become more stable with passage of time with some baseline variation, as shown in figure 1. Almost same findings were obtained when mean diastolic blood pressure and mean heart rate were traced, as shown in figures 2 and 3. In order to see how significant the variation in these recorded readings was, we carried out comparisons of mean systolic and diastolic blood pressure and heart rate among zero, 24 hr and 3h hours and the results are shown in table 1. Systolic blood pressure at zero reading was significantly higher than that at both 24 hour and 3 hour (P < 0.05); in addition we found no significant difference in mean systolic blood pressure between 24 hour and 38 hour readings (P > 0.05). Similarly, diastolic blood pressure at zero reading was significantly higher than that at both 24 hour and 3 hour (P < 0.05); in addition we found no significant difference in mean diastolic blood pressure between 24 hour and 38 hour readings (P > 0.05). Moreover, heart rate at zero reading was significantly higher than that at both 24 hour and 3 hour (P < 0.05); in addition we found no significant difference in mean heart rate between 24 hour and 38 hour readings (P > 0.05). Capital letters were used to demonstrate the significance of difference; similar letters indicate no significant difference while different letters indicate significant difference at P ≤ 0.05; letter A being the highest value. In the present study we demonstrated that significant variation existed among the recorded readings of blood pressure and heart rate during 40 hours period of patients follow up. In particular, baseline reading was always significantly higher than readings recorded several hours later. For that reason, we believe that a decision should not be made about patient blood pressure on a single office reading and that even 2 or more readings at the same office visit within short period of time does not reflect the situation of the patient. Hence proper monitoring for at least 24 hour is essential for initial diagnosis of hypertension and also for justification of treatment success or failure. A growing belief among experts is emerging that ABPM is recommended to exclude white coat hypertension in subjects with high office blood pressure readings 28.
In “a recent draft statement from the US Preventive Services Task Force (USPSTF)” 31, the use of ABPM was encouraged for excluding white coat hypertension and confirming the diagnosis of hypertension. Other highly qualified institutes also encouraged ABPM not only to make sure about white coat hypertension in older adults who are yet untreated but also to evaluate success of antihypertensive drugs 29-30. The use of ABPM for the detection of treated cases of white coat hypertension and evaluating the white coat response in subjects already on antihypertensive drug is unresolved issue. This is due the substantial amount of literatures supporting the cardiovascular advantages of antihypertensive medication given on office based readings. A comparison of rate of reduced CVD events when blood pressure measurement is done using conventional clinical assessment versus ABPM is unknown. One study, which was a randomized trial, demonstrated no change in left ventricular mass following discontinuation of antihypertensive medication based on ABPM; however, the period of study was relatively short 32.

Table 1: mean blood pressure and heart rate measurements during selected points of time

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Reading time</th>
<th>Zero</th>
<th>24 hr</th>
<th>38 hr</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>±25.34</td>
<td>±19.24</td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td></td>
<td>A</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>152.16</td>
<td>128.20</td>
<td>132.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>±25.34</td>
<td>±19.24</td>
<td>±17.39</td>
</tr>
<tr>
<td>Diastolic blood pressure</td>
<td></td>
<td>A</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>89.76</td>
<td>68.27</td>
<td>71.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td>±31.60</td>
<td>±13.46</td>
<td>±13.44</td>
</tr>
<tr>
<td>Heart rate</td>
<td></td>
<td>A</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>89.69</td>
<td>75.18</td>
<td>76.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>±13.72</td>
<td>±10.71</td>
<td>±14.35</td>
</tr>
</tbody>
</table>

CONCLUSION

Proper monitoring for at least 24 hour is essential for initial diagnosis of hypertension and also for justification of treatment success or failure.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Medicine, Al-Diwaniyah teaching hospital, Al-Diwaniyah province, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

3. Joffres M, Falaschetti E, Gillespie C, et al. Hypertension prevalence, awareness, treatment and control in national surveys from England, the USA and Canada, and correlation with stroke and


Detection of Antibodies for Goat Brucellosis in Some Reigns of Diyala Province

Osamah Nassir Wali¹, Ahmed Hanash Al-Zuhairi ², Raad Mahmood Hussein ², Afaf Abdullah³
¹Department of Basic Medical Sciences, Collage of Nursing, Misan University, Iraq, ²Department of Internal and Preventive, Collage of Veterinary Medicine, Diyala University, Iraq, ³Department of Clinical Pharmacy, Collage of Pharmacy, Misan University, Iraq

ABSTRACT

Brucellosis is a chronic infectious disease affecting mammalian animals characterized by abortion or birth of incomplete embryos, which can be spent and cause placental retention, non-fertilization and end with whole or partial infertility. To find out the prevalence of this disease in Diyala city, this study included 215 serum samples randomly collected from adult goats and non-vaccinated areas in Baquba, Muqdadiya and Wajihiya districts for the period from August 2017 to September 2018 in Diyala. A randomized test was performed on the samples and the indirect ELISA test was performed. The results were 36 positive samples (16.74%) in Rose Bengal Test and 33 positive (15.34%). samples when used ELISA indirect were appeared.

Keywords: Brucellosis, goat, disease, Rose Bengal, ELISA, abortion.

INTRODUCTION

Brucellosis is one of the most widespread and economically important transitional diseases in the world, and it is infectious diseases caused by a bacteria belonging to Brussella species, which includes, Brucella Canis, Brucella Suis, Brucella Melitensis and Brucella abortus. The economic importance of the disease is caused by high abortion in pregnant animals, failure to reproduce, poor birth rates and death of large numbers of animals due to uterine inflammation, placental retention, negative economic impact in the food and animal industries. The complexity of epidemiology of brucellosis and the difficulty in effective control measures are linked to the infection of the main productive field animals (sheep, goats, cows, buffalo) with humans. The Brucella surveillance system is one of the high priority methods of strategic importance to endemic and disease-free countries. Laboratory diagnosis using indirect serological methods such as ELISA and Rose Bengal Test (RB) test, which detects the significant increase in the standard of antibodies to the blood and other body fluids, is acceptable for diagnosis. Serology from the process of detection of infection and treatment of cases before reaching advanced stages, as well as that the control programs on the disease depends entirely on the methods of serological diagnosis, so this study aims to detect the increase in the standard antibodies to Brucella infected goats in some areas of Diyala by using Checking pink corneal (RB) and (ELISA) examination.

MATERIALS AND METHOD

A total of 215 serum samples were randomly collected from non-vaccinated adult female goats and these samples were selected from several geographical locations in Diyala city to collect blood samples. Blood samples were collected from the jugular vein of the goat, where 5 ml were withdrawn and then placed in 10 mL clean sterile glass tubes. The blood samples were left in the refrigerator at 4 °C for 12-18 hours for thrombosis formation. The centrifuge was then used at a speed of 2000 rpm for separating the serum. Then serum was removed by sterilized Pasteur pipettes and was poured in sterile small plastic tubes. A Rose Bengal Test was performed in the same day and the remaining serums were placed in a frozen -20C until the ELISA test was performed. The test of Rose Bengal was carried out...
with a drop of 0.03 ml of sample serum which taken by special micropipette and placed on the paper card, then added a 0.03 ml drop of the Brucella antigen to detect the presence of antibodies to the Brucella bacteria. After that we mixed the antigen with a serum well by a special plastic rods and manage the mix by a hand for 4 minutes, during this period (4 minutes ) if the Agglutination was appearance means that the result is positive according to the company’s instructions for the antigen. The antigen supplied by APPROVED CO which was a concentrated strand of Brucella. Melitensis and Brucella. abortus that killed by using 0.5% phenol with thermoplastic method and dyed with pinkish bengal stain. The indirect ELISA test was performed using commercial kit of syanova CO. which based in it is work on the manufacturer’s protocol to using this kit for the competitive ELISA to detect the antibodies found in the tested serum for the Brucella bacterial infection.

RESULTS AND DISCUSSION

Results of the Rose Bengal Test showed that 36 goat out of the 215 examined were positive (16.74%) Figure (1). Then those positive samples were re-examined using ELISA test which showed that 33 case were given positive results (15.34%) of the total number of tested samples. These results of RB test and ELISA test sera of goat are shown in Table (1). Brucella disease is a widespread infectious disease in various countries of the world despite the global interest to this disease and its spread methods and the provision of different methods for diagnosis and elimination of it, but it remains one of the most important problems that adversely effect on the economic and health factor of both human and animal. Brucellosis affects cows and ruminants around the world. The Rose Bengal Test was used in this study as a Survey and diagnostic test because it is an easy and fast test. The results of this study showed that of the total 215 samples, only 36 samples were given a positive result for the Rose Bengal Test Which was equivalent to (16.74%) As in Figure (1). However, Mathur et al. (16), Salem et al. (17) and Hadad and Al-azawy (18) who found that the rate of infection in goats in different regions of Iraq was 5.2%, 5.91% and 4.4% respectively. This difference in the results was expected because the previous studies were conducted from a long time which has been nearly 40 years old and this indicates the increase in the prevalence of disease between the herds in the period between (1974-2017).

This increase in prevalence is due to several factors. The existence of an integrated program to control the disease, the ignorance of educators dangerous and rapid spread, and not follow the health methods in the disposal of the abortion fetus and other contaminated materials. All these factors and other may facilitated the spread of the disease as well as the ease of movement of animals from one area to another without supervision, malnutrition, the method of breeding and management of goat fields play an important role in facilitating the spread of the disease. Non-domestic animals, which are important coiffers of disease, which carry the disease and spread to many areas. The results of this study differed from the findings of Alalam et al. (21) as the ratio was 25.6%. In non-vaccinated goats, using roasted coffee test Cal is due to the different places of study conducted in Nineveh governorate. When comparing the results of the Rose Bengal Test used in the study with the results of the ELISA test, we note that the ELISA test differed, the ELISA test showed 33 positive cases of 36 positive cases of Rose Bengal Test, and this difference Which was equivalent to (15.34%) As in Figure (1), is due to the ELISA test of high accuracy and efficiency, Quinn and his group (24) indicated that the ELISA test was one of the most reliable tests in the diagnosis of brucellosis, and that the Rose Bengal Test was only a qualitative test. Pain Meal in this test should confirm or test the installation of the completed ELISA test. And that this result is constant with suggestion of Radostits et al. (25) that Rose Bengal Test gives false positive results 1-3%, which is caused by either the interactions with negative bacteria or the presence of antibodies in the blood of vaccinated animals. Our results not agreed with the reports of Hanqawi (26) this difference of Hanqawi is due to the difference in place of the study, which was conducted in Mosul city, which found a difference in the proportion of infection of the flood and goats from one area to another in the same province. The results of this study are consistent with the findings of Saleh and his group (27). They concluded that the test of Rose Bengal Test is a good scan. The ELISA test showed high efficiency in diagnosis of brucellosis, therefore can be used to diagnose the infection. A comparison of the results of this study with the results of previous studies conducted in Iraq shows that there is a difference in the incidence of brucellosis in goats from one region to another within one governorate and between different governorates, and this is evident in the results of the studies conducted in Iraq.
Table (1) Results of the Rose Bengal test and ELISA test in goats

<table>
<thead>
<tr>
<th>Type of Brucellosis test</th>
<th>Number of samples</th>
<th>Number of positive samples</th>
<th>Percentage of positive samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rose Bengal Test</td>
<td>215</td>
<td>36</td>
<td>16.74%</td>
</tr>
<tr>
<td>ELISA Test</td>
<td>36</td>
<td>33</td>
<td>15.34%</td>
</tr>
</tbody>
</table>

CONCLUSION

A randomized test was performed on the samples and the indirect ELISA test was performed. The results were 36 positive samples (16.74%) in Rose Bengal Test and 33 positive (15.34%) samples when used ELISA indirect were appeared.

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 Medical Sciences, Collage of Nursing, Misan University, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Determination of Immunological Markers associated with Celiac Disease in Basrah province

Sufyan Abdul Rahman Abd Ali AL-Hilfi¹, Wafaa S. Shani¹
¹Department of Biology, College of Science, University of Basrah, Basrah, Iraq

ABSTRACT

Present work designed to study the role of sHLA-G and some proinflammatory and anti-inflammatory cytokines in pathogenicity of Celiac disease. So 65 blood samples from Celiac patients and 24 healthy control were included in recent study. Sera of all studied groups (patients and control were enrolled in order to determining the level of sHLA-G, proinflammatory cytokines (TNF-α, IL-6) and anti-inflammatory cytokines (IL-10). In addition. Present data revealed that (39) or (23%) of patients with a family history with a significant differences (p≤0.05). In relation to immunological markers which studied in recent work the sHLA-G molecule in sera of patients showed a highly significant elevation (p≤0.001) in compared with control. In the case of inflammatory cytokines IL-6 and TNF-α were also recorded a highly significant and significant increasing (p≤0.016) and (p≤0.05) respectively in celiac patients in comparable to control. Present data related to anti-inflammatory cytokines IL-10 revealed a significant arising in patients in comparison with the control. Furthermore, significant statistical correlation was occurred between sHLA-G and TNF-α with TTG, whereas IL-6 and IL-10 not recorded any correlation with TTG.

Keywords: TNF-α, HLA-G, Tissue inflammatory response, IL-10, IL-6, Celiac disease.

INTRODUCTION

Celiac disease (CD) is a chronic inflammatory disease which develops in genetically predisposed individuals definition also as T cell-mediated inflammatory disorder with autoimmune features and it has environmental and immunologic components. It is characterized by an immune response to ingested wheat gluten and related proteins of rye and barley that leads to inflammation, villous atrophy and crypt hyperplasia in the proximal symptoms and signs of CD include diarrhea, abdominal distention, abdominal pain, weight loss, fatigue, and malnutrition. Gliadin has also been shown to stimulate the production of IL-8 and TNF-α by peripheral blood monocytes from patients with active CD in vitro. Cytokines are implicated in both enhancing and suppressing immune responses through their influence on T-cells and other immune effectors. IL-2, IL-12, TNF-α and TNF-β activate Th-1 lymphocytes, whereas IL-4, IL-5, and IL-10 lead to Th-2 cell activation. In CD, both Th-1 and Th-2 cytokines have been shown to be elevated. Because only limited published data are available, present work directed to perform a comprehensive evaluation of serum cytokine and sHLA-G levels in individuals with CD. Tumor necrosis factor alpha (TNF alpha), this cytokine produced by monocytes, macrophages neutrophils, T-cells and NK-cells during acute inflammation and play a very specific role in the pathogenesis of Celiac disease. TNF-α gene is located on the human chromosome 6 and is arranged within class III region between MHC class II (HLA-II) and MHC class I (HLA-I). Interleukin-6 (IL-6) is a multifunctional pro-inflammatory cytokine regulates the immune response, hematopoiesis, the acute phase response, and inflammation. IL-6 very important in promoting Th17 differentiation and have a role in several inflammatory and immune conditions as well as in CD. Increased serum levels of IL-6 were found in patients with CD in some studies. Interleukin 10 have role in regulation of T cell response due to their induction of their IL-1, IL-6 and TNF-α production by macrophages.

DOI Number: 10.5958/0976-5506.2019.00406.6

Corresponding author:
Department of Biology, College of Science, University of Basrah, Basrah, Iraq.
and increase production of Th 1 cytokines in CD. Increased Levels of Interleukin-10 were observed in patients with active CD. The formation of Th 1 cytokine plays an important role in the pathogenesis of CD.

**MATERIALS AND METHOD**

**Patients**

A total of 300 samples of blood were collected from suspected patients from Al–Basrah General Hospital, AL-Sader Educational Hospital in Basrah province during the period of September 2017 to May 2018. For data collection, special questionnaire were made including: name, family history, presence and duration of gluten free diet and symptoms. While blood samples of control were collected from 24 normal persons without any sign or symptoms of bowel disease, and represented as a control after examining of TTG antibody titer and those only (24) with a negative -ve results of TTG antibody considered as a control.

**Measurement of sHLA-G concentrations**

The level of sHLA-G was assessed in plasma using commercially available kit (My Bio source USA, Cat No. MB2600014). sHLA-G ELISA is sandwich enzyme immunoassay for the quantitative measurement of soluble forms of HLA-G in pre-coated micro plate wells with monoclonal anti-sHLA-G antibody, specifically shed HLA-G1 (membrane bound) and HLA-G5 (soluble isoform), measured at a wavelength of 450 nm, Calibration curves based on the absorbance of calibrators of known concentration were used to determine the concentration of sHLA-G in each sample.

**Determination of serum level of proinflammatory cytokines (IL-6 and TNF-Alpha)**

The level of IL-6/TNF-Alpha was assessed in serum using commercially available kit (Komabitech Company, South Korea, Cat No.IL-6 K0331194, and TNF-Alpha K0331131). IL-6/TNF-Alpha ELISA is sandwich enzyme immunoassay for the quantitative measurement of IL-6/ TNF-Alpha in pre-coated micro plate wells.

**Determination of serum IL-10 level.**

The level of IL-10 was assessed in serum using commercially available kit (16.1.French, Cat No. 950.060.192). IL-10 ELISA is sandwich enzyme immunoassay for the quantitative measurement of IL-10 in pre-coated micro plate wells with monoclonal anti-IL-10 antibody.

**Statistical analysis**

Statistical analysis were performed by using Statistical Package for the Social Sciences (SPSS) version 11. Data were presented as means (±) standard errors (S.E) and standard deviation (S.D). Chi-Square test was used to assess the difference whether statistically significant between percentage frequencies or not. Continues variable were compared by using T-test to assess the significance differences between groups. The group statistics show up soluble HLA-G high significant differences compared with other cytokines (TNF-α, IL-10, IL-6). P≤0.050 considered as statistically significant and P ≤ 0.001 considered as high significant in all performed tests.

**RESULTS AND DISCUSSION**

**Data analysis**

During the period of October 2017 to May 2018. Out of these, 65 samples are positive to CD.

**Demographic study**

The demographic study of investigated cases includes family history, presence and duration of gluten free diet.

**Family history**

Recent study indicated that 39 cases had a positive family history of celiac disease, while 26 cases had a negative family history of CD. Table (1).

**Evaluation of soluble human leukocyte antigen g (sHLA-G) serum levels**

A highly significant (P ≤ 0.001) elevation of serum sHLA-G were recorded in patients with celiac disease (16.57) in comparison with control group, Table (2).

**Evaluation of Interleukin 6 (IL-6) serum levels**

Documented data showed elevated level of IL-6 in patients with celiac disease (433.42), comparably to control was (228.02), with a significant differences (P ≤
Evaluation of Tumor necrosis factor (TNF-α) serum levels

Results demonstrated that there was an increasing in serum levels of TNF-α in patients with celiac disease (413.34), in comparison with control (138.31) with a significant differences (P ≤ 0.05 ,)table (4).

Determination of anti-inflammatory cytokines

Evaluation of Interleukin 10 (IL-10) serum levels

Recorded data showed that the level of IL-10 in patients with celiac disease (163.93) was higher than those of control (66.46), with a significant differences (P≤0.02),table (5).

Correlation of tissue transglutaminase with studied cytokines and sHLA-G

Statistical analysis revealed that there was a significant correlation between expression levels of TTG with sHLA-G and TNF-α whereas IL-6 and IL-10 not recorded any correlation with TTG,table (6).

Demographic study

Celiac disease is an autoimmune disorder where the ingestion of gluten leads to damage in the small intestine. Celiac disease might be considered a public health problem and, as primary prevention is not possible, the debate on mass screening should be reopened.

Family history

Family history is important factor (about 40% of first degree relatives of celiac patients are affected by the disease), but not determine whether an endoscopic biopsy should occur. It merely help for determine whether patients in an at-risk group, or not. In the current study the total of patients whose have family history are 39 patients. Furthermore, the observation of celiac disease is more common in relatives to celiac disease individuals and the high concordance rate between monozygotic twins indicate a strong genetic influence on disease risk (about 10% of first degree relatives of celiac patients are affected by the disease).

Serological study

Soluble Human leukocyte antigen G (sHLA-G)

In the present study, all the cases selected have symptoms of CD. The statistical analysis show that there was a high significant differences (P≤0.001) of sHLA-G in patients in compared with control. The results of current study in concomitant with the studies of Carosella et al (2008) which states the most important risk factor for disease development. As expected, patients who are already on a gluten-free diet who are unwilling or unable to undergo a gluten challenge, and patients whose refuse a gastroscopy. sHLA-G testing can be useful when assessing family members of patients with celiac disease. These results indicated that there were a high statistically significant association between CD patients and HLA-G. However, so, according to recorded differences in recent work which could be indicative of the involvement of HLA-G in CD susceptibility, we suggesting that, sHLA-G could play a role for diagnosis a complex disease such as CD. Therefore, from the results of this study, increased expression of HLA-G can lead to immune tolerance of the patients. The tolerogenic properties of HLA-G have deleterious effects in celiac disease by reducing immune reaction responses. Several studies revealed that HLA-G was more frequently observed in advanced stages of celiac disease indicating its considerable clinical relevance to celiac patients. Current data showed sHLA-G levels in the celiac patients group were significantly elevated compared to those in the control group, which is similar to previously published data reported that sHLA-G in celiac patients was significantly higher than that of control subjects. We suggests that the production of HLA-G can be a good indicator for the clinical prognosis of CD, these results are similar to previously reported by Jericho et al., 2017.

Interleukin 6 (IL-6)

Serum levels of IL-6 in patients with active celiac disease compared with controls have been found to be significantly increased with (p≤0.016) (probably the IL-6 can be considered as an important target for cytokine specific therapies. Similarly it has been shown that serum level of IL-6 was substantially elevated in patients with CD and positively correlated with inflammatory activity of disease. Several studies have reported an association between the IL-6 and celiac diseases. The results of present work indicated that the level of IL-6 highly elevated in patients with CD.
Data resulted from this particular study demonstrated that TNF-α levels were significantly increased in the sera of patients with (p ≤ 0.05) compared to the serum levels in normal subjects this deal with other studies. The high level of the proinflammatory cytokine belongs to the primary role of TNF-α in the regulation of immune cells, which is able to induce apoptotic cell death. TNFα is considered as a master regulator of pro-inflammatory cytokine production.

Interleukin 10 (IL-10)

Present study indicated that IL-10 expression increased in patients with celiac disease compared to the control with significant differences (P ≤ 0.020), this results deal with other studies. Therefore, it is believed that increase expression of anti-inflammatory cytokine (IL-10) is expected due to its role in regulation of the immune system.

Correlation between sHLA-G, serum cytokines and celiac disease

According to recorded results a high positive correlation was noted with the TNF-α and tTG with significant difference (p≤0.04). Furthermore other finding also noticed a significant correlation between expression levels of the sHLA-G and Ttg with (p ≤ 0.05)

Table (1). Distribution of celiac patients according to family history.

<table>
<thead>
<tr>
<th>Family history</th>
<th>Non family history</th>
<th>Percentage% of family history</th>
<th>Percentage% of non family history</th>
<th>P -value</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>26</td>
<td>60%</td>
<td>40%</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Table (2): Concentration of (sHLA-G) in patients and control groups .

<table>
<thead>
<tr>
<th>Groups</th>
<th>No.of cases</th>
<th>Mean of sHLA-G Pg/ml</th>
<th>Range</th>
<th>S.D (±)</th>
<th>S.E</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>65</td>
<td>16.57</td>
<td>(10.98-21.1)</td>
<td>3.33</td>
<td>0.413</td>
<td>0.001</td>
</tr>
<tr>
<td>Control</td>
<td>24</td>
<td>5.85</td>
<td>(2.62- 9.49)</td>
<td>1.97</td>
<td>0.411</td>
<td></td>
</tr>
</tbody>
</table>

Table (3). Concentration of (IL-6) in patients and control groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>No.of cases</th>
<th>Mean of IL-6 Pg/ml</th>
<th>Range</th>
<th>S.D (±)</th>
<th>S.E</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>65</td>
<td>433.42</td>
<td>(364.0-493.7)</td>
<td>40.63</td>
<td>5.04</td>
<td>0.016</td>
</tr>
<tr>
<td>Control</td>
<td>24</td>
<td>228.02</td>
<td>(187.6- 284.8)</td>
<td>27.36</td>
<td>5.70</td>
<td></td>
</tr>
</tbody>
</table>

Table (4) Concentration of (TNF-α) in patients and control groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>No.of cases</th>
<th>Mean of TNF-α Pg/ml</th>
<th>Range</th>
<th>S.D(±)</th>
<th>S.E</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>65</td>
<td>413.39</td>
<td>(288.3-479.2)</td>
<td>51.15</td>
<td>6.34</td>
<td>0.05</td>
</tr>
<tr>
<td>Control</td>
<td>24</td>
<td>138.31</td>
<td>(200.9- 75.4)</td>
<td>37.39</td>
<td>7.79</td>
<td></td>
</tr>
</tbody>
</table>

Table (5): Concentration of (IL-10) in patients and control groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>No.of cases</th>
<th>Mean of IL-10 Pg/ml</th>
<th>Range</th>
<th>S.D (±)</th>
<th>S.E</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>65</td>
<td>163.94</td>
<td>(111.6-212.9)</td>
<td>28.87</td>
<td>3.58</td>
<td>0.02</td>
</tr>
<tr>
<td>Control</td>
<td>24</td>
<td>66.46</td>
<td>(40.7- 93.9)</td>
<td>17.89</td>
<td>3.73</td>
<td></td>
</tr>
</tbody>
</table>
Table (6) Correlation of Ttg with sHLA-G, IL-6, TNF-α and IL-10.

<table>
<thead>
<tr>
<th></th>
<th>HLA-G</th>
<th>IL-6</th>
<th>TNF-α</th>
<th>IL-10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>p-value</td>
<td>R</td>
<td>p-value</td>
</tr>
<tr>
<td>TTG</td>
<td>0.177</td>
<td>0.005*</td>
<td>-0.123</td>
<td>0.330*</td>
</tr>
</tbody>
</table>

CONCLUSION

In the case of inflammatory cytokines IL-6 and TNF-α were also recorded a highly significant and significant increasing (p≤0.016) and (p≤0.05) respectively in celiac patients in comparable to control. Present data related to anti-inflammatory cytokines IL-10 revealed a significant arising in patients in comparison with the control. Furthermore, significant statistical correlation was occurred between sHLA-G and TNF-α with TTG, whereas IL-6 and IL-10 not recorded any correlation with TTG.

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 Basrah, Basrah, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

Multi Drug Resistant and Biofilm Formation of Staphylococci Isolated from Patient with Diabetic Foot Infection in Basra Province

Rabee A. Al-Jaleel Ibrahim1, Zainab R Abdul-Hussein2

1Ministry of Health, Basra Health Department, Department of Public Health. Basra, Iraq,
2University of Basra College of Science, Department of Pathological analyses. Basra, Iraq

ABSTRACT

Diabetic foot ulcers (DFUs) is characterized by a classical triad of neuropathy, ischemia and infection. Patient with Diabetic foot ulcers frequently required lower extremity amputations. Eighty one swab samples were collected from patient with Diabetic foot ulcers, from different hospitals in Basra governorate (Al – Fayhaa General Hospital). All samples were subjected to classical biochemical tests. Gram positive – vitek 2 card system was used for the definitive diagnosis of Gram – positive bacterial samples, 78 samples Gram – positive from 81 samples were diagnosed, and these isolates were found to be of the following species: *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Staphylococcus xylosus*, *Staphylococcus haemolyticus*, *Staphylococcus caprae*, *Staphylococcus lugdunensis*, *Staphylococcus warneri*, *Staphylococcus sciuri*, *Staphylococcus pseudintermedius*, *Staphylococcus lentus*, *Enterococcus faecalis*, *Streptococcus thoralensis*, *Kytococcus sedentarius*. Many bacterial species showed multiple – drug resistance, such as *Staphylococcus aureus* which were more resistant to the following antibiotics: Oxacillin, Trimethoprim, Tetracycline. The results showed that *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Staphylococcus xylosus*, *Staphylococcus haemolyticus*, *Staphylococcus caprae*, *Staphylococcus lugdunensis*, *Staphylococcus warneri*, *Staphylococcus pseudintermedius*, *Staphylococcus lentus*, *Enterococcus faecalis*, and *Kytococcus sedentarius* had the ability to produce biofilm which revealed by various methods, such as Congo red agar qualitative method, and tissue culture plate quantitative method.

Key words: Staphylococcus, DFI, MDR, Biofilm formation.

INTRODUCTION

Diabetes mellitus (DM) is defined by World Health Organization (WHO) as chronic disease that occurs when the pancreas produces insufficient insulin or when the body is not able to use the insulin produced (Health Topics – Diabetes Mellitus, 2014). Diabetic foot ulcer is a higher complication of diabetes mellitus, and the major complication of diabetic foot, diabetic foot is characteristic by various pathological complications, like neuropathy, immunopathy, retinopathy, and peripheral vascular disease. Infection and Foot ulceration, with or without osteomyelitis, resulting to the development of gangrene and necessity of limb amputation are the common pathogens before used treatment in mild, and moderate infection. Severe or previously treated, chronic infections are most poly microbial. Soft tissue mild infection may treated effectively with oral antibiotics such as Cephalexin, clindamycin, and dicloxacillin. The severe infection of soft tissue may primarily treated with intravenously injection with clindamycin plus ciprofloxacin. Often the pathogens have synergistic relationships such as *Staphylococcus aureus* and *Pseudomonas* spp, *Enterococcus* spp *Escherichia coli*, *Proteus* spp which developed tissue damage. The results of injury infection can start from superficial, when the delaying treatment and

Corresponding author: 
Rabee A. Al-Jaleel Ibrahim.
Ministry of Health, Basra Health Department, Department of Public Health. Basra, Iraq.
Email: zr692002@gmail.com
weak body protection mechanisms result in neutrophil disorder and vascular inadequacy. It can diffuse to the contiguous and sub cutaneous tissue, deep structures. The multidrug resistance (MDR) of pathogens cause infection are responsible for the increased admission of hospitalization, morbidity and mortality with diabetic patients. The predominant organisms, that responsible of acute diabetic foot infections is "Staphylococcus aureus" the common isolated pathogen.

**MATERIALS AND METHODS**

The sample were collected from diabetic patients as a 81 specimens from fore foot, mid foot, and hind foot during September 2017 to February 2018 in Al – fayhaa general hospital and Basra teaching hospital. Wound swabs obtained from patients with diabetic foot ulcers were collected from the center area of wound before the patients used any treatment , wash the ulcer by (N.S 0.9%) vigorously then dipped in wound deeply by rotated a cross wound a zigzag technique, with avoiding any attachment to the ends of wound. Swabs were streaked on (MSA) , blood agar, MacConekey’s agar, Nutrient agar. Then the inoculated petridish plate was incubated at 37°C for 24 hrs and the plates were observed the growth of bacteria.

**Biofilm formation**

**Congo Red Agar (CRA):**

To study the ability of studying bacteria to form biofilm by using Congo red agar (CRA) method, one loopfull of mannitol salt agar culture was streak as one line on (CRA) plates and incubated at 37°C for 24 hrs. The production of rough black colonies indicated the strong formation of biofilm, where as colonies that had flat red appearance were non biofilm producer.

**Tissue culture plate (TCP)**

In this method of mannitol salt agar culture incubated for 24 hrs were sub cultured on Tryptic Soy Broth (TSB) suplemeted with 1% glucose and incubated at 37°C for 24 hrs, then 20μl of culture was transferred to the well of 96- well sterile flat bottomed and 180μl of (TSB) was added to make the dilution also negative control wells have only the broth, and added to two wells, incubated again the plate plastic at 37°C for 24 hrs, with moisture condition. After incubation, broth was discarded and wells were washed three times with phosphate buffer saline (PBS) 200μl , (pH , 7.2) , and emptied by converting plates upside down with gentle tapping on the back of plate, then adherent cells was fixed with 200μl of methanol to each well, after 15minutes the microplate were emptied of stain to each well and air dried , then stained with crystal violet by addition 160μl , then rinsed the excess of stain under running tap water, then plates were air dried, and solubilized with 160μl of glacial acetic acid 33% (v/v) to each well. Elisa reader were used to measure the optical density (OD) of each well at 630nm. The second plate which have the same arrangement of isolates were stained with safranin instead of crystal violet and measured on 450nm.

**Statistical Analysis**

Statistical program for social science (spss) was used to analyze the data. Chi – square ( ) test, P – value less than 0.05 was considered as statistically significant and P- value less than 0.01 considered as highly significant.

**RESULTS AND DISCUSSION**

**Bacterial Isolation**

All samples were cultured on mannitol salt agar, blood agar base , and MacConkey agar media. The study showed the out of 81 samples 46 (56.97%) Gram positive of samples were belong to as a pure culture of, and 32 (39.51%) were mixed culture (Gram – positive & Gram – negative), and 3 (3.70%) samples were Gram – negative as a pure culture.

**Identification of isolates using GP - VITEK2 system**

The results of vitek2 system analysis revealed that bacterial species isolates were identified as Staph. aureus 33(42.31%) , Staph. epidermidis 12(15.38%) , Staph. xylosus 11(14.1%) , Staph. haemolyticus 7(8.97%) ,Staph. caprae 3(3.85%) ,Staph. lugdunensis 2(2.56%) , Staph. warneri 2(2.56%) , Staph. sciuri 2(2.56%) , Staph. pseudintermedius 2(2.56%) , Staph. lentus 1(1.28%) , Enterococcus faecalis1(1.28%), Streptococcus thoraltensis1(1.28%), Kytococcus sedentarius1(1.28%), Figure (1).

**Multi - drug resistance**

Present study showed that many bacterial species isolated from diabetic foot infection were resistant to more than three classes of antibiotic and considered as multi drug resistant (MDR). As it revealed in table (2).
16(20.51%) of Staph. aureus were MDR, and 7(8.97%) of Staph. epidermidis, followed by Staph. haemolyticus in which 6(7.69%) isolates were MDR, and 2(2.56%) and 1(1.28%) of each of Staph. lugdunensis and Staph. xylosus respectively were considered as MDR. The study also showed that of Staph. aureus was highly susceptible to Nitrofurantoin, Linezolid, vancomycin, Teicoplanin, Gentamycin, Rifampicin, Erythromycin and Clindamycin, resistant to some other antibiotics such as Benzyl penicillin, Oxacillin, Tetracycline and Trimethoprim + Sulfamethoxazole. Table (3) showed that the highest antibiotic resistance (P < 0.01) was in 47 (62.7%) isolates resistant to Benzyl penicillin, while the highest antibiotic sensitive was in 59 (78.7%) isolated to Nitrofurantoin with (P <0.01). All isolates were resistant to more than three antibiotics, therefore Staph. spp was classified as MDR according to the disk automated alternative method GP - vitek 2 card analysis system. And some isolates of Staph. aureus was resistant to three classes of antibiotics such as Benzyl penicillin, Erythromycin, Tetracycline and Rifampicin 8(24.24%) , Trimethoprim 8(24.24%) and finally Vancomycin 5(15.15%).

Biofilm formation

To determine the ability of studied bacteria to produce biofilm, two different methods were used, the first one was an qualitative method by which congo red agar was used. The second method quantitative tissue culture plate method in which results shows strong positive reaction when the absorption had an optical density of > 0.240, and ( 0.120 – 0.240) considered as moderate, while (< 0.120) considered as non-producer. Results showed that 25(32.0%) of Staph. aureus gave a moderate result by producing black colonies on congo red agar. While 7(8.94%) isolates showed strong result, and only 1(1.28%) isolates was non biofilm producer, for other bacterial species results were as following: Staph. epidermidis strong 7 (8.97%), non 3 (3.84%), moderate 2 (2.56%). Staph. xylosus strong 7(8.97%), moderate 2 (2.56%), non 2 (2.56%), Staph. haemolyticus moderate 3(3.84%), strong 2 (2.56%), non 2(2.56%). Staph. caprae strong 2 (2.56%), moderate 1(1.28%). Staph. lugdunensis strong 1(1.28%), moderate 1(1.28%). Staph. warneri moderate 2(2.56%). S. pseudintermedius moderate 2 (2.56%). Staph. sciuri moderate 1(1.28%), non 1 (1.28%). Staph. lentus moderate 1 (1.28%). Enterococcus faecalis strong 1 (1.28%). Streptococcus thoraltensis non 1 (1.28%). Kytococcus sedentarius strong 1 (1.28%). As they are revealed in table (4).

The relationships between bacterial species resistance to antibiotic and their ability to form biofilm of diabetic foot infections

The results of present study exhibited that all bacterial species that were multi drug resistant had the ability to produce biofilm except for these of Staph. haemolyticus from them only 5 from six of MDR isolates formed biofilm. As it shown in table (5).

In the present study results of identification of isolated bacterial species obtained from GP – vitek 2 system showed that a higher percentage (42.31%) of isolates were identified as Staph. aureus followed by Staph. epidermidis (15.38%), Staph. xylosus (14.1%), Staph. haemolyticus (8.97%), Staph. caprae (3.85%), Staph. lugdunensis, Staph. warneri, Staph. sciuri, and Staph. pseudintermedius with the same percentage (2.56%), Enterococcus faecalis, Streptococcus thoraltensis, Staph. lentus, and Kytococcus sedentarius with the same percentage (1.28%). This data indicated the most frequent bacteria was Staph. aureus and Staph. epidermidis, and Staph. xylosus and less frequent was Staph. haemolyticus, Staph. caprae, Staph. lugdunensis, Staph. warneri, Staph. sciuri, Staph. pseudintermedius, Staph. lentus, Enterococcus faecalis, Streptococcus thoraltensis, and Kytococcus sedentarius as reported previously. These results harmonious with study of (20). Staph. aureus is a Gram – positive bacteria, classified in the family staphylococcaceae. It is one of common pathogen exist in diabetic foot infection (DFI). The present study results showed that Staph. xylosus were susceptible to Vancomycin (19.6%).

Table (1) : The purity of Bacteria isolated from (D. F. I.)

<table>
<thead>
<tr>
<th>Total No of sample</th>
<th>Pure Gram+ve</th>
<th>Mixed Gram+ve &amp; Gram – ve</th>
<th>Gram-ve</th>
</tr>
</thead>
<tbody>
<tr>
<td>81</td>
<td>46 (56.79)%</td>
<td>32 (39.51)%</td>
<td>3 (3.70)%</td>
</tr>
</tbody>
</table>
Table (2) Antibiotics susceptibility & multi drug resistant of Gram – positive bacteria isolated from (D.F.I)

<table>
<thead>
<tr>
<th>Bacterial species</th>
<th>Antibiotics susceptibility</th>
<th>Multi drug resistance</th>
<th>Not detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph. aureus</td>
<td>17</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Staph. epidermidis</td>
<td>5</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Staph. haemolytus</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Staph. lugdunensis</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Staph. warneri</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Staph. pseudintermedins</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Staph. xylosus</td>
<td>10</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Staph. caprae</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Staph. sciuri</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Staph. lentus</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Enterococcus faecalis</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Streptococcus thoraltensis</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Kytococcus sedentarius</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table (3) Antibiotic resistant of *Staphylococcus* spp isolated from (D.F.I).

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>No.(% of resistant)</th>
<th>No. (% of sensitive)</th>
<th>P. value, DF=1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzylpenicillin (PEN)</td>
<td>47(62.7%)</td>
<td>2(2.7%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Oxacillin(OXA)</td>
<td>44(58.7%)</td>
<td>5(6.7%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Erythromycin (ERY)</td>
<td>27(36%)</td>
<td>34(45.3%)</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Clindamycin (CLI)</td>
<td>27(36%)</td>
<td>33(44%)</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Tetracycline(TET)</td>
<td>25(33.3%)</td>
<td>33(44%)</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Rifampicin(RIF)</td>
<td>17(22.7%)</td>
<td>44(58.7%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Trimethoprim / sulfamethoxazole (SXT)</td>
<td>16(21.3%)</td>
<td>45(60%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Fosfomycin (FOS)</td>
<td>16(21.3%)</td>
<td>33(44%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Fusidic Acid (F.A)</td>
<td>13(17.3%)</td>
<td>27(36%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Levofloxacin (LIV)</td>
<td>12(16%)</td>
<td>40(53.3%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Teicoplanin (TEC)</td>
<td>10(13.3%)</td>
<td>51(68%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Vancomycin VAN)</td>
<td>9(12%)</td>
<td>51(68%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Gentamicin (GEN)</td>
<td>9(12%)</td>
<td>47(62.7%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Tobramycin (TOB)</td>
<td>8(10.7%)</td>
<td>46(61.3%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Nitrofurantoin (NIF)</td>
<td>1(1.3%)</td>
<td>59(78.7%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Moxifloxacin (MXF)</td>
<td>1(1.3%)</td>
<td>50(66.7%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Linezolid (LZD)</td>
<td>0</td>
<td>55(73.3%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Tigecycline (TGC)</td>
<td>0</td>
<td>54(72%)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Mupirocin (MUP)</td>
<td>0</td>
<td>12(16%)</td>
<td>&lt; 0.01</td>
</tr>
</tbody>
</table>

Table (4): Distribution of Bacterial species from (DFIs) according Detection of biofilm formation by various methods.

<table>
<thead>
<tr>
<th>Bacterial species</th>
<th>Biofilm formation</th>
<th>Strong</th>
<th>Moderate</th>
<th>non</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph. aureus</td>
<td>7</td>
<td>25</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Staph. epidermidis</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Staph. xylosus</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Staph. haemolyticus</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Staph. Lugdunensis</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Staph. Warneri</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Staph. Pseudintermedies</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Staph. sciuri</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Staph. caprae</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Staph. lentus</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Enterococcus faecalis</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Streptococcus thoralensis</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Kytococcus sedentarius</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
Table (5): The relationships between bacterial species resistance to antibiotic and their ability to form biofilm of (DFIs).

<table>
<thead>
<tr>
<th>Bacterial species</th>
<th>MDR</th>
<th>Biofilm formation</th>
<th>p-value DF=1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph. aureus</td>
<td>16</td>
<td>15</td>
<td>Not significant</td>
</tr>
<tr>
<td>Staph. epidermidis</td>
<td>7</td>
<td>7</td>
<td>Not significant</td>
</tr>
<tr>
<td>Staph. haemolyticus</td>
<td>6</td>
<td>5</td>
<td>Not significant</td>
</tr>
<tr>
<td>Staph. lugdunensis</td>
<td>2</td>
<td>2</td>
<td>Not significant</td>
</tr>
<tr>
<td>Staph. warneri</td>
<td>2</td>
<td>2</td>
<td>Not significant</td>
</tr>
<tr>
<td>Staph. pseudintermedius</td>
<td>2</td>
<td>2</td>
<td>Not significant</td>
</tr>
<tr>
<td>Staph. xylosus</td>
<td>1</td>
<td>1</td>
<td>Not significant</td>
</tr>
<tr>
<td>Staph. caprae</td>
<td>0</td>
<td>0</td>
<td>Not significant</td>
</tr>
<tr>
<td>S. sciuri</td>
<td>0</td>
<td>0</td>
<td>Not significant</td>
</tr>
<tr>
<td>S. lentus</td>
<td>1</td>
<td>1</td>
<td>Not significant</td>
</tr>
<tr>
<td>Enterococcus faecalis</td>
<td>1</td>
<td>1</td>
<td>Not significant</td>
</tr>
<tr>
<td>Streptococcus thoraltensis</td>
<td>0</td>
<td>0</td>
<td>Not significant</td>
</tr>
<tr>
<td>Kytococcus sedentarius</td>
<td>0</td>
<td>1</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

Figure (1): Percentage of bacterial species isolates from (DFIs).

CONCLUSION

Many bacterial species showed multiple – drug resistance, such as Staphylococcus aureus which were more resistant to the following antibiotics:- Oxacillin, Trimethoprim, Tetracycline. The results showed that Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus xylosus, Staphylococcus haemolyticus, Staphylococcus pseudintermedius, Staphylococcus sciuri, Staphylococcus lentus, Enterococcus faecalis, and Kytococcus sedentarius had the ability to produce biofilm which revealed by various methods, such as Congo red agar qualitative method, and tissue culture plate quantitative method.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Ministry of Health, Basra Health Department, Department of Public Health. Basra, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Pathogenic Microorganism’s Detection in tap Water in Basra city treated within Ultraviolet radiation

Mahmoud S. Al-Mounas 1, Wathiq A. Al-Ramdhan1, Rasha N. Jawad2, Ekhlass B. Zubairy3

1Southern Technical University, Technical Institute of Basra, Environmental Pollution, Research Unit, Iraq,
3Southern Technical University, Technical Institute of Basra, Environmental Pollution, Nursing Technical Department, Iraq, 4Southern Technical University, Technical Institute of Basra, Environmental Pollution, Research Unit, Iraq

ABSTRACT

Tap water samples were collected from various areas of the Governorate of Basra including the areas (Al-Saybah, Abu Al-Khasib, AL-Zubair, AL-Medina, AL-Asmai, AL-Ashiar (AL-Timemeia), AL-Juwenena, and AL-Burjeseah). Samples were collected in May to June, 2017. The results were recorded for isolate and identified bacteria from tap water. Six types of microbes were found in the examined samples with frequencies reach to 50 colonies, Bacillus, E. coli, Klebsiella, Candida, Staphylococci, and Hyphae fungi. The study shows that, the area of AL-Asmai was most polluted of microbes than other area while the Abu-AL-Khasib was less polluted. Samples of contaminated water were treated using short wave –Germicidal (UV-C) light to kill or inhibit microbial growth. The results were discussed and analyzed.

Keywords: Pathogenic microbes, tap water, occurrence, short wave- Germicidal Ultraviolet-C radiation.

INTRODUCTION

Pathogenic microorganisms as indicators of microbiological study of domestic water as indices of fecal pollution, tap and domestic water guidelines were used for interpretation of microbial water quality results. Indicator bacteria used to assess the microbiological quality of water with fecal indicator bacteria are a measure of water fecal pollution for consumption. The most commonly used fecal indicator are the coliform group (total coliform, fecal coliform and Escherichia coli) are commonly used to evaluate microbiological quality of water and as a parameter to estimate disease risk has entered drinking water and then caused a waterborne diarrheal disease. The spread of waterborne diseases such as cholera, dysentery, hepatitis A and B, giardiasis and Hemolytic uremic syndrome are commonly reported in low-income countries as provision of safe water, sanitation and hygiene is sub-optimal. Isolate and Identified the bacterial species such as; Escherichia coli, Enterobacter, Shigella spp, Salmonella spp, Klebsiella spp, Pseudomonas spp, Aeromona spp, and Vibrio cholera from drinking water in five different sectors in Salahdeeen province using the technique of membranes filters. Not every bacterial strain is considered dangerous, but only the intestinal bacteria, that cause diseases in the digestive system are stressed (Dysentery, liver disease, typhoid fever and cholera). Bacterium was isolated E.coli type O157:H7 causing bloody diarrhea as a result of throwing dead animals in the river as a source of pollution. Safe drinking water and basic sanitation is of crucial importance to the preservation of human health, especially among children. Overtime, new UV methods were used to purify water and wastewater. Currently, several countries have developed regulations that allow system to disinfect their drinking water supplies with UV light. UV water treatment devices can be used for well water and surface water disinfection and its most efficient for treating high- clarity, purified reverse osmosis distilled water. The current study were to detect some of pathogenic micro-organism in tap water and its quality, in different regions at Basra city/ southern Iraq. This problem were treated using a short wave - Germicidal radiation.

MATERIALS AND METHOD

Three randomly tap water samples were collected from various areas of the Governorate of Basra (south of Iraq) of the areas (Al-Saybah, Abu Al-Khasib,
Water samples were collected in a clean plastic bottles (250 ml) sterile and 3 samples were selected for each area.

Pull (5 ml) of each tube and mix together in a test tube size (15 ml) and then each 1 ml was examined according to the next culture method.

The samples were culturing on the Nutrient agar medium with four replicates per sample where they were inoculated in two ways of pouring and spreading.

The specimens incubated in the incubator for 24-48 hours at a temperature of 37°C to detect bacterial types gram positive and gram negative using compound microscope test oil immersion.

After the culture and the detection, the results were recorded and the samples were damage in the Autoclave with 121 ° C and 1 Atom. for quarter of an hour (Fig. 1).

Two methods were used to expose contaminated tap water samples to short wave –Germicidal Ultraviolet-C light in order to eliminate these types of bacteria for different UV dose. The first, ultraviolet tube (6 watt-Philips TUV6W G6T5) was completely flooded with contaminated tap water samples (Fig. 2) and the second was to expose the contaminated tap water samples at the hood directly to the short wave Ultraviolet light within the same wavelength.

RESULTS AND DISCUSSION

According to Figure (3), six types of microbes were investigated through the tap water samples, in the frequencies reach to 50 colonies. This result shows that, the area of AL-Asmai is most polluted of microbes than other area while the Abu-AL-Khasib is less polluted. Figure (3) also shows that the percentage Occurrence of E.coli and Bacillus spp was 62.5%, with frequencies 20% and 36%, respectively.

The estimated Occurrence (O) and frequency (F) are found according to the following equations [19]:

\[ O\% = \frac{\text{occurrence the microbe type}}{\text{Number of total aeras}} \]  \hspace{1cm} \ldots (1)

\[ F\% = \frac{\text{The number of isolates microbe one type}}{\text{Total number of isolated microbes}} \]  \hspace{1cm} \ldots (2)

The distribution of tap water microbes of Basra governorate is shown in (Fig. 4).

These results indicate the pollution of water of the river sewage and sewage treatment before return to the river and thus move to the projects of water purification of Basra province, which agree with [10, 11] which considered that the presence of these bacteria is an indicator of water pollution, making it unfit for consumption. The Occurrence of bacterial pathogens Bacillus and Escherichia coli caused by severe watery diarrhea accompanied by dehydration, it also causes of skin disease and wound infection which is a type of enterobacterace present in the sewage water of the rivers and streams located in the tap waters of Al-Zubair and Al-Asma‘i. The appearance of these types of bacteria, which have been isolated and diagnosed in the tap water of the study areas, provide evidence of the safety and appropriateness of water for human consumption. Perhaps this is due to the damage of the water distribution network. The current study confirmed the contamination of the Coliforms bacteria of some of the Abu Ghraib wells and the pseudomonas aeruginosa bacteria 20. In Baghdad governorates about (14%) of dehydration cases occurred in 2011. This study evaluated some of microbiological aspect of water quality; a technical term, water in relation to guideline values of human consumption, point –of-use (POU) water treatment refers to the household level. Initial results of treatment of contaminated water samples using short wave UV-C and a dose between 3750 – 7500 (mW.s/cm²), for both methods, showed a decrees in the growth of bacterial genera colonies. The UV dose was calculated as follows [14]:

\[ \text{UV dose (mW.s/cm}^2\text{)} = \text{UV intensity mW./cm}^2 * \text{Exposure time (second).} \]
CONCLUSION

From this study we can conclude the followings: Basra is one of the governorates most impacted by outbreaks of water born diseases. The area of AL-Asmai was most polluted of microbes than other area while the Abu-AL-Khasib was less polluted. Six types of microbes were found in the examined samples with frequencies reach to 50 colonies, *Bacillus*, *E. coli*, *Klebsiella*, *Candida*, *Staphylococci*, and *Hyphae fungi*. Primary results of treatment of contaminated tap water samples using short wave- Germicidal Ultraviolet radiation with doses between 3750 – 7500 (mw. s/cm²), for both methods, are reduced bacterial genera colonies growth.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Southern Technical University, Technical Institute of Basra, Environmental Pollution, Research Unit, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Radiographical Findings in Patients with Temporomandibular Joint Clicking Compared with Control Group by Cone Beam Computed Tomography (CBCT)

Haider Mahde Idan¹, Fawaz D. Al-Aswad¹

¹Oral Medicine, College of Dentistry, University of Baghdad, Iraq

ABSTRACT

Study the radiographical finding of temporomandibular joint in patients with clicking by using cone beam computed tomography (CBCT) and determination of osteoarthritic changes and compared with control group. The study sample consisted of seventy eight patients with disk displacement and thirty one as control subjects. Patients with temporomandibular joint internal derangement were divided into four groups according to the Diagnostic Criteria for Temporomandibular Disorders (Group 1-disk displacement with reduction. Group 2-disk displacement with reduction with intermittent locking. Group 3-disk displacement without reduction with limited opening. Group 4-disk displacement without reduction without limited opening). The most frequent radiographical findings in patients with internal derangement was erosion (41.02%) then followed by flattening (30.41%), osteophyte (17.3%), pseudo cyst (12.8%), and finally sclerosis (9.61%). Erosion and flattening are the most prevalent types of degenerative bone changes in patients with internal derangement.

Keywords: clicking, internal derangement, CBCT.

INTRODUCTION

Temporomandibular joint (TMJ) is a ginglymus arthrodial joint, which composed from condyle, glenoid fossa, articular disc, articular tubercle, synovial membrane, retro discal tissue and the joint capsule. ¹ Temporomandibular disorders (TMDs) refers to a collective term including clinical problems that involve the masticatory muscles, (TMJ) and associated structures ² Temporomandibular disorders is frequently associated with disc displacement and degenerative changes in the (TMJ) ³ The main characteristics of disk displacement with reduction are the joint sounds (clicking). Not only disk displacement with reduction but, other conditions may be related to clicking since it may result from, such as shape alterations, hypermobility, disc adhesions, perforations, and even a chronic disk displacement without reduction.⁴ Degenerative joint disease affects both hard and soft tissues including subchondral bone, cartilage and synovial membrane, it can be diagnosed when there is either crepitus or radiographic changes of bone.⁵ Degenerative changes of bone in the (TMJ) are significantly more frequent in the condylar head than in the articular eminence, and characterized by the presence of osteophyte, erosion, pseudo cysts, sclerosis, and flattening, these findings are considered to be radiographic signs of osteoarthritic changes.⁶,⁷ so detection and evaluation of these bony changes are fundamental for successful diagnosis of degenerative joint disease.⁸ Cone beam computed tomography (CBCT) characterized by less radiation than multislice CT and produce a 3D image of the mineralized maxillofacial tissue with minimum distortion, (CBCT) have been efficient in the diagnosis of many changes of bone in the (TMJ).⁹ Cone beam computed tomography (CBCT) detects bone changes accurately, such as erosion, flattening, osteophyte, subchondral sclerosis, remodeling and ankylosis in the condyle, temporal fossa and in the articular eminence.

MATERIALS AND METHOD

The study sample consisted of seventy eight patients with (TMJ) internal derangement (Current TMJ noises, click(s) during jaw movement) and thirty one as control subjects with age range from 21-45 years old. Patients with internal derangement were divided into...
four groups according to the Diagnostic Criteria for Temporomandibular Disorders.\textsuperscript{10}

1-Group 1 (thirty three patients with disk displacement with reduction).

2-Group 2 (fifteen patients with disk displacement with reduction, with intermittent locking).

3-Group 3 (fifteen patients with disk displacement without reduction, with limited opening).

4-Group 4 (fifteen patients with disk displacement without reduction, without limited opening).

The control group attending to taking CBCT scanning for different diagnostic purposes which have no (TMDs) by clinical examination and patients were clinically diagnosed to have intra articular joint disorders, and had CBCT scan image using CBCT scanner (NewTom VGi)\textsuperscript{TM}.

Cone beam computed tomography (CBCT) scanner: Image were acquired by a CBCT scanner (NewTom VGi)\textsuperscript{TM}. Scanning parameter were 110 VP, 24 second, 5.7 mA, avoxel size of 0.5 mm, and a field of view of 16 cm x 14cm or 24 cm x 19 cm CBCT images.

Cone-beam computed tomography images were taken with the subject in an upright standing position. The patients were instructed to look into their eyes in a front mirror to obtain a natural head position. No bite blocks were used, and the scan was taken in the maximum intercuspation position.

Radiographical study of (TMJ) in control and patients by using cone beam computed tomography (CBCT) and determination of osteoarthritic changes, right and left temporomandibular joints were examined separately, resulting in a total of 218 temporomandibular joints.

Comparing the sagittal and coronal images, we classified degenerative bony changes into five types: osteophytes, erosion, flattening, subchondral sclerosis, and pseudocysts,\textsuperscript{18} the criteria for the types of condylar bony change shows as follows:

- Osteophytes: marginal bony outgrowths on the condyle.

- Erosion: an area of decreased density or discontinuity or irregularity of the cortical bone.

- Flattening: a flat bony contour deviating from the convex form.

- Sclerosis: an area of increased density of cortical bone extending into the bone marrow.

- Pseudocysts: well-circumscribed osteolytic area adjacent subcortical bone area without cortical destruction.

The selection of the patients based on exclusion criteria, described as the following, individuals suffer from the following conditions:

Edentulous patients, patients with class I-II Kennedy classification, patients with parathyroid gland disease, patients with neoplastic disease, and patients with developmental disorders of the (TMJ) such as condylar aplasia, hypoplasia, or hyperplasia; were not considered in this study.

RESULTS AND DISCUSSION

Table (1) showed distribution of radiographical findings “flattening, erosion, pseudo cyst, osteophyte and sclerosis” among studied groups and sides, such that “Frequencies, and Percent’s”, as well as comparisons significant using Binomial test for the two dichotomous category responding in each group, and a contingency coefficient are accounted in each side with their significant levels. The most frequent radiographical finding in patients with internal derangement (Group 1+Group 2+Group 3+Group 4) was erosion(41.02%) then followed by flattening (31.41%), osteophyte (17.3%), pseudo cyst (12.8%), and finally sclerosis (9.61%) with a statistically highly significant relationship at P<0.01 when comparison with control group as show in table(2). The result show highly significant relationship at P<0.01 and significant relationship at P<0.05 in comparison of patient have disk displacement with reduction(Group 1+Group 2) with control group regarding erosion, flattening and sclerosis, while non-significant relationship at P>0.05 regarding pseudocyst and osteophyte. Regarding patient have disk displacement without reduction (Group 3+Group 4) in comparison with control group recorded highly significant at P<0.01 regarding erosion, flattening, sclerosis and osteophyte, while non-significant relationship at P>0.05 regarding pseudocyst as show in table (2). Figure (2) represent graphically plotting of cluster bar charts for radiographical findings “flattening,
erosion, pseudo cyst, osteophyte and sclerosis” among studied groups in both sides (right plus left). Clinical examination often fails to detect degenerative changes of bone accurately; therefore, radiographical examination is performed to support in their diagnosis and treatment. The bony parts of the (TMJ) are best identified by computed tomography. Generally, deformation of bone characterized in degenerative joint disease are erosion, osteophytes, flattening, sclerosis, and pseudo cysts, each type of bony change occurs in different stages of degenerative joint disease and has different clinico-pathological meanings. Patients free-symptom, whose disks are detected by magnetic resonance image (MRI) in the normal anatomical position, demonstrate minimal morphological change in the condylar head and articular eminence in light processes of normal adaption. In contrast, substantial change in the osseous part is observed in symptomatic patients with internal derangement. Many studies are estimated that disorders of (TMJ) affect approximately 30% of the population which is asymptomatic form as internal joint derangement comprising disc displacement and structural changes due to osteoarthritis and osteoarthrosis, this explained why control group in the present show a percent of morphological bone changes of condyle. The present study demonstrated that erosion have high percent in patients and control group, this may be explained by that condylar erosions represent the early stage of degenerative bone changes, indicated of that an active process of degenerative bone disease associated with an inflammatory part may be occur. Many studies have stated an association of disc displacement with or without reduction, inability to attain jaw opening (locking), limitation of mouth opening, with pain and osteoarthritic changes of the (TMJ). The present study stated that disk displacement with reduction were more frequent than others types of disk displacement, this agree with the results of Isabela et al., 2012 they demonstrated that anterior disk displacement with reduction was the condition most frequently found in patients (males and females). Regarding degenerative alterations, they stated that significant relationship between anterior disc displacement with reduction and condylar flattening, and anterior disc displacement without reduction and related degenerative bony alterations of condylar head. Honda et al., 2008 stated that degenerative bony alterations in the condylar head, such as osteophytes and erosion, have been related to advanced cases of anterior disc displacement without reduction, meaning that the mechanism of induction of osteoarthrosis of the TMJ may be related to alterations in the position of the articular disk. The study by Öguchen-Toller et al., 2002 showed that degenerative condylar alterations were associated with an increase in the degree of anterior disc displacement, Emshoff et al., 2001 found signs of degenerative bony alterations of the joints with disk displacement without reduction more than in cases of disc displacement with reduction, also Bernhardt et al., 2007 diagnosed signs of condylar degeneration in the joints with disc displacement without reduction more than in the TMJs with disc displacement with reduction, this agree with the result of the present study that stated degenerative alterations in patients with disk displacement without reduction more than in disk displacement with reduction.

<table>
<thead>
<tr>
<th>Finding</th>
<th>Side</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flatting</td>
<td>Right</td>
<td>Present</td>
<td>No. &amp; %</td>
<td>7(21.2%)</td>
<td>5(33.3%)</td>
<td>6(40%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Absent</td>
<td>No. &amp; %</td>
<td>26(78.8%)</td>
<td>10(66.7%)</td>
<td>9(60%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C.S. (*)</td>
<td>P=0.002</td>
<td>HS</td>
<td>P=0.302</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td>Present</td>
<td>No. &amp; %</td>
<td>7(21.2%)</td>
<td>7(46.7%)</td>
<td>5(33.3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Absent</td>
<td>No. &amp; %</td>
<td>26(78.8%)</td>
<td>8(53.3%)</td>
<td>10(66.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C.S. (*)</td>
<td>P=0.002</td>
<td>HS</td>
<td>P=1.000</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (1): Distribution of “flattening, erosion, pseudo cyst, osteophyte and sclerosis” according to studied groups and sides with comparisons significant.
Table (1): Distribution of “flattening, erosion, pseudo cyst, osteophyte and sclerosis” according to studied groups and sides with comparisons significant.

<table>
<thead>
<tr>
<th></th>
<th>Right</th>
<th></th>
<th>Left</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present No. &amp; %</td>
<td>11(33%)</td>
<td>7(46.7%)</td>
<td>11(73.3%)</td>
</tr>
<tr>
<td></td>
<td>Absent No. &amp; %</td>
<td>22(67%)</td>
<td>8(53.3%)</td>
<td>4(26.7%)</td>
</tr>
<tr>
<td></td>
<td>C.S. (*)</td>
<td>P=0.082</td>
<td>NS</td>
<td>P=1.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Present No. &amp; %</td>
<td>5(15.2%)</td>
<td>4(26.7%)</td>
<td>5(33.3%)</td>
</tr>
<tr>
<td></td>
<td>Absent No. &amp; %</td>
<td>28(84.8%)</td>
<td>11(73.3%)</td>
<td>10(66.7%)</td>
</tr>
<tr>
<td></td>
<td>C.S. (*)</td>
<td>P=0.000</td>
<td>HS</td>
<td>P=0.118</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pseudo cyst</td>
<td>Present No. &amp; %</td>
<td>5(15.2%)</td>
<td>2(13.3%)</td>
<td>5(33.3%)</td>
</tr>
<tr>
<td></td>
<td>Absent No. &amp; %</td>
<td>8(84.8%)</td>
<td>13(86.7%)</td>
<td>13(86.7%)</td>
</tr>
<tr>
<td></td>
<td>C.S. (*)</td>
<td>P=0.000</td>
<td>HS</td>
<td>P=0.007</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Present No. &amp; %</td>
<td>4(12.1%)</td>
<td>0(0.0%)</td>
<td>2(20%)</td>
</tr>
<tr>
<td></td>
<td>Absent No. &amp; %</td>
<td>29(87.9%)</td>
<td>15(100%)</td>
<td>12(80.0%)</td>
</tr>
<tr>
<td></td>
<td>C.S. (*)</td>
<td>P=0.000</td>
<td>HS</td>
<td>P=0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Osteophyte</td>
<td>Present No. &amp; %</td>
<td>3(9.1%)</td>
<td>2(13.3%)</td>
<td>1(6.7%)</td>
</tr>
<tr>
<td></td>
<td>Absent No. &amp; %</td>
<td>30(90.9%)</td>
<td>13(86.7%)</td>
<td>9(60%)</td>
</tr>
<tr>
<td></td>
<td>C.S. (*)</td>
<td>P=0.000</td>
<td>HS</td>
<td>P=0.007</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Present No. &amp; %</td>
<td>3(9.1%)</td>
<td>2(13.3%)</td>
<td>1(6.7%)</td>
</tr>
<tr>
<td></td>
<td>Absent No. &amp; %</td>
<td>30(90.9%)</td>
<td>13(86.7%)</td>
<td>14(93.3%)</td>
</tr>
<tr>
<td></td>
<td>C.S. (*)</td>
<td>P=0.000</td>
<td>HS</td>
<td>P=0.007</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sclerosis</td>
<td>Present No. &amp; %</td>
<td>3(9.1%)</td>
<td>2(13.3%)</td>
<td>1(6.7%)</td>
</tr>
<tr>
<td></td>
<td>Absent No. &amp; %</td>
<td>30(90.9%)</td>
<td>13(86.7%)</td>
<td>14(93.3%)</td>
</tr>
<tr>
<td></td>
<td>C.S. (*)</td>
<td>P=0.000</td>
<td>HS</td>
<td>P=0.007</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Present No. &amp; %</td>
<td>2(6.1%)</td>
<td>0(0.0%)</td>
<td>2(13.3%)</td>
</tr>
<tr>
<td></td>
<td>Absent No. &amp; %</td>
<td>31(93.9%)</td>
<td>15(100%)</td>
<td>13(86.7%)</td>
</tr>
<tr>
<td></td>
<td>C.S. (*)</td>
<td>P=0.000</td>
<td>HS</td>
<td>P=0.000</td>
</tr>
</tbody>
</table>
Table (2): Association’s comparisons for radiographical findings (flattening, erosion, pseudocyst, osteophyte and sclerosis) among studied groups in both sides (right plus left).

<table>
<thead>
<tr>
<th>Groups</th>
<th>Flattening No. &amp; %</th>
<th>Erosion No. &amp; %</th>
<th>Pseudocyst No. &amp; %</th>
<th>Osteophyte No. &amp; %</th>
<th>Sclerosis No. &amp; %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk displacement with reduction Group1+Group2 (96 joints)</td>
<td>26 (27.0%)</td>
<td>27 (28.1%)</td>
<td>11 (11.45%)</td>
<td>10 (10.4%)</td>
<td>7 (7.29%)</td>
</tr>
<tr>
<td>Control (62 joints)</td>
<td>3 (4.8%)</td>
<td>9 (14.5%)</td>
<td>5 (8.06%)</td>
<td>4 (6.45%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>P-value</td>
<td>P=0.000 HS</td>
<td>P=0.000 HS</td>
<td>P=0.210 NS</td>
<td>P=0.180 NS</td>
<td>P=0.016 S</td>
</tr>
<tr>
<td>Disk displacement without reduction Group3+Group4 (60 joints)</td>
<td>23 (38.33%)</td>
<td>37 (61.66%)</td>
<td>9 (15%)</td>
<td>17 (28.3%)</td>
<td>8 (13.33%)</td>
</tr>
<tr>
<td>Control (62 joints)</td>
<td>3 (4.8%)</td>
<td>9 (14.5%)</td>
<td>5 (8.06%)</td>
<td>4 (6.45%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>P-value</td>
<td>P=0.000 HS</td>
<td>P=0.000 HS</td>
<td>P=0.424 NS</td>
<td>P=0.007 HS</td>
<td>P=0.008 HS</td>
</tr>
<tr>
<td>Intra articular joint disorders (Internal derangement) Group1+Group2+Group3+Group4 (156 joints)</td>
<td>49 (30.41%)</td>
<td>64 (41.02%)</td>
<td>20 (12.8%)</td>
<td>27 (17.3%)</td>
<td>15 (9.61%)</td>
</tr>
<tr>
<td>Control (62 joints)</td>
<td>3 (4.8%)</td>
<td>9 (14.5%)</td>
<td>5 (8.06%)</td>
<td>4 (6.45%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>P-value</td>
<td>P=0.000 HS</td>
<td>P=0.000 HS</td>
<td>P=0.000 HS</td>
<td>P=0.000 HS</td>
<td>P=0.000 HS</td>
</tr>
</tbody>
</table>

CONCLUSION

Erosion and flattening are the most prevalent types of degenerative bone changes in patients with internal derangement.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Dentistry, University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

Examination Protocol.2014.


Soft Generalized Vague Sets: An application in Medical Diagnosis

Audia Sabri Abd Al Razzaq, Luay Abd Hani Al Swidi

1College of Basic Education, Babylon University, Iraq, 2College of for Pure Sciences, Babylon University, Iraq

ABSTRACT

The concept of soft sets and its application in decision making is introduced by Molodtsov. Later it is generalized to soft fuzzy set. In our study we introduce the definition of soft Generalized vague set and define operations on it namely subset, equality, null set union, intersection, OR operator, AND operator on soft generalized vague sets with illustrative example.

Key words: Medical Diagnosis, application, Soft Generalized Vague Sets.

INTRODUCTION

Fuzzy set concept was introduced by L. Zadeh. Vague sets was presented by Molodtsov. Molodtsov introduced the concept of soft set, Maji et al presented the definition of fuzzy soft set and studied its properties and applying it in decision making. Soft fuzzy set was defined by Yoa et al, intuitionistic fuzzy set defined by K. Atanassov. The generalized vague soft set was presented by K. Alhazaymeh et al. In our study we define the soft generalized vague set and also the operations equality, subset, null set union, intersection OR, AND operator on it. The vague sets are used to analysis the reliability of systems like we apon systems which are expensive or dangerous to measure experimentally, expert thoughts are used to provide the fault information but estimates usually are uncertain and it cannot rule out any possibility of system failures including power systems, nature reasons, human error and others, see 4,10.

Hence vague sets can solve this kind of problems. For more details see 1,7,10,11.

Preliminaries:

In this section we recall some definitions which concern our study

Definition 2.1. Let be the universe of discourse.

A vague set over U is characterized by a truth membership function. If generic element of U is denoted by then the lower bound on the membership grade of derived from evidence for is denoted by and the lower bound on the negation of is denoted by . and both associate a real number in [0,1] with each point in X, where

\[ t_\tilde{v}(x_i) + f_\tilde{v}(x_i) \leq 1 \]

\[ 1 - f_\tilde{v}(x_i) \]

\[ t_\tilde{v}(x_i) \]

\[ x_i \]

Figure (1) . A vague Set

Definition (2.2)

Let X be an initial universe set and E be a set of parameters. A pair

\( (F, E) \) is called a soft set over X iff F is a mapping of E into the set of all subsets of the set X, i.e. \( F : E \to P(X) \)
Definition (2.2) 
Let X be an initial universe set and E be a set of parameters. Let P(U) denoted the power set of X.
Let A ⊆ E. A pair (F, A) is called a soft fuzzy set over U, where F is a mapping given by F:A → P(U) and
F(x) = \{y ∈ U | (x, y) ∈ \tilde{R}_\alpha, x ∈ A, y ∈ U, \alpha ∈ [0,1]\} (Here \tilde{R}_\alpha denotes \alpha-cut relationship between E and X.

Definition (2.3) 
Let X be an initial universe set and E be a set of parameters. Let P(∪) denoted the power set of X.
Let A ⊆ E. A pair (F, A) is called a soft fuzzy set over ∪, where F is a mapping given by F:A → P(U) and
F(x) = \{y ∈ U | (x, y) ∈ \tilde{R}_\alpha, x ∈ A, y ∈ U, \alpha ∈ [0,1]\} (Here \tilde{R}_\alpha denotes \alpha-cut relationship between E and X.

Definition (2.4) 
Let U be the universal set and E be the set of parameters, let A ⊆ E and F:A → V(U) and \alpha be a vague subset of A i.e \alpha: A → [0,1], where V(U) the collection of all vague subsets of U. Let \tilde{R}_\alpha:A → V(U) × [0,1] be a function defined as follows
\tilde{R}_\alpha(a) = \{x, t_F(x), 1 - f_F(x)\} \alpha(a)\}
Then \tilde{R}_\alpha is called the generalized vague soft set over (U, E)

Definition (2.5) 
Let \tilde{R}_\alpha and \tilde{G}_\beta be two generalized vague soft sets our (U, E). then the generalized vague soft relation R from (\tilde{R}, \alpha) to (\tilde{G}, \beta) is the function R: A × B → V(U) × [0,1] defined by
R(a, b) = \tilde{R}_\alpha(a) \cap \tilde{G}_\beta(b) \forall (a, b) ∈ A × B.

3. Soft Generalized Vague Set:
In this section the definition of soft generalized vague set is introduced and we define some operations on it.

Definition (3.1): 
Let \tilde{R}_\alpha(\tilde{R}_t, \tilde{R}_f) be a vague subset of \times Y and \tilde{R}_\alpha is defined as vague relationship from X to Y and \tilde{R} (x, y) denotes the degree of correspondence between x and y based on the relationship \tilde{R}. Let V(X × Y) represents the family of vague relationship from X to Y. The set \tilde{R}_\alpha = \{(x, y) ∈ X × Y: \tilde{R}_t(x, y) ≥ \alpha and \tilde{R}_f(x, y) ≤ \alpha\} \sqsupseteq X × Y
Is defined as \alpha-cut set if \tilde{R} ∈ V(X × Y) for \alpha ∈ [0,1].
**Definition (3.2):**

Let $X$ be an initial set and $E$ be a set of parameters. Let $P(X)$ represents the power set of $X$. Let $A \sqsubseteq E$. A pair $(V, A)$ is called a soft generalized vague set over $X$. $V$ is a mapping given by $V : A \rightarrow P(X)$ and

$$V(x) = \{y \in X | (x, y) \in R_{\alpha}, x \in A, y \in X, \alpha \in [0,1]\}$$

**Definition (3.3):**

For two soft generalized vague sets $(G, A_{\alpha})_{\bar{R}}$ and $(H, B_{\beta})_{\bar{R}}$ over common universe $X$.

$(G, A_{\alpha})_{\bar{R}}$ is a soft generalized vague subset of the soft generalized vague set $(G, A_{\alpha})_{\bar{R}}$, (briefly, $(G, A_{\alpha})_{\bar{R}} \sqsubseteq (H, B_{\beta})_{\bar{R}}$) if

(i) $\alpha \subseteq \beta$

(ii) $A \subseteq B$

(iii) $\forall \alpha \in A, G(\alpha)$ is a soft generalized vague

Two soft generalized vague sets $(G, A_{\alpha})_{\bar{R}}$ and $(H, B_{\beta})_{\bar{R}}$ over common universe $X$ are equal if $(G, A_{\alpha})_{\bar{R}} \sqsupseteq (H, B_{\beta})_{\bar{R}}$ and $(G, B_{\beta})_{\bar{R}} \sqsupseteq (H, A_{\alpha})_{\bar{R}}$

**Definition (3.4):**

Let $(V, A)_{\bar{R}}$ a soft generalized vague set over the universe $X$ is an empty soft generalized vague set $(\emptyset)$ if $\forall x \in A, V(x) = \emptyset$ (null or empty soft generalized vague set).

**Definition (3.5):**

Let $(G, A_{\alpha})_{\bar{R}}$ and $(H, B_{\beta})_{\bar{R}}$ are two soft generalized vague sets over the common universe $X$. Their union is the soft generalized set $(P, C)_{\bar{R}}$ where $C = A \cup B$ and $e \in C$

$$P(e) = \begin{cases} G(e) & e \in A - B \\ H(e) & e \in B - A \\ G(e) \cup H(e) & e \in A \cap B \end{cases}$$

and we write the union as below:

$(G, A_{\alpha})_{\bar{R}} \sqcup (H, B_{\beta})_{\bar{R}} = (P, C)_{\bar{R}}$

**Definition (3.6):**

The intersection of two soft generalized vague sets $(G, A_{\alpha})_{\bar{R}}$ and $(H, B_{\beta})_{\bar{R}}$ over the common universe $X$ is the soft generalized vague set $(Q, C)_{\bar{R}}$ where $C = A \cap B$ and $\forall e \in C$
\[
Q(e) = \begin{cases} 
G(e) & e \in A - B \\
H(e) & e \in B - A \\
G(e) \cup H(e) & e \in A \cap B
\end{cases}
\]
and write the intersection as below: \((G,A)_R \cap (H,B)_R = (Q,C)_R\)

4. **OR and AND operations:**

We introduce the operations AND, OR on soft generalized vague set respectively.

**Definition (4.1):**

If \((G,A)_R\) and \((H,B)_R\) be two soft generalized vague sets then "\((G,A)_R\) and \((H,B)_R\)" is a soft generalized vague set.

Denoted by: \((G,A)_R \land (H,B)_R\)

And defined by :
\[
(G,A)_R \land (H,B)_R = (G \cap H, A \times B)_R
\]

**Definition (4.2):**

If \((G,A)_R\) and \((H,B)_R\) are two soft generalized vague sets then "\((G,A)_R\) OR \((H,B)_R\)" is a soft generalized set denoted as follows "\((G,A)_R \lor (H,B)_R\)

And defined as follows
\[
(G,A)_R \lor (H,B)_R = (Q, A \times B)_R
\]

5. **Illustrative Example as an application :**

Suppose that is a patient having certain visible symptoms is infected by Ameobiasis disease, which is characterized by the infection of human large intestine by the parasite Entamoeba histolytica. This disease so called Amebic dysentery. An investigation in a clinical labrotary is performed to diagnosis whether the patient is infected by this disease or not. The symptoms of the disease is characterized by: mucoid stool, diarrhea, vomiting, abdominal pain, abdominal cramp, and may be reach to (bloody diarrhea.)

Let the universe set \(X\) consists of two elements (cases), infected denoted by \(c_1\) and non infected denoted by \(c_2\) i.e. \(X = \{c_1, c_2\}\)
\[ X = \{c_1, c_2\} \], the set of parameters \( E \) is the set of certain approximations determined by the clinical laboratory symptoms diagnosis.

Let \( E = \{e_1 (\text{macoid stool}) , e_2 (\text{diarrhea}) , e_3 (\text{vomiting}) , e_4 (\text{abdominal pain}) , e_5 (\text{abdominal cramp}) , e_6 (\text{bloody diarrhea})\} \)

To determine whether the patient suffering from Ameobiasis disease or not, we follow the following steps:

1. Suppose the relation \( \tilde{R}_\alpha \) is:

\[
\tilde{R}_\alpha = (0.5, 0.8)/(c_1, e_1) + (0.6, 0.7)/(c_1, e_2) + (0.4, 0.6)/(c_1, e_3)
\]
\[
+ (0.4, 0.7)/(c_1, e_4) + (0.5, 0.5)/(c_1, e_5) + (0.7, 0.9)/(c_1, e_6)
\]
\[
+ (0.3, 0.4)/(c_2, e_1) + (0.1, 0.9)/(c_2, e_2) + (0.5, 0.6)/(c_2, e_3)
\]
\[
+ (0.0, 0.8)/(c_2, e_4) + (0.1, 0.9)/(c_2, e_5) + (0.2, 0.8)/(c_2, e_6)
\]

Let \( \alpha(e_1) = 0.3 \), \( \alpha(e_2) = 0.5 \), \( \alpha(e_3) = 0.5 \), \( \alpha(e_4) = 0.6 \), \( \alpha(e_5) = 0.2 \), \( \alpha(e_6) = 0.7 \)

The soft generalized vague set as a collection of vague approximation as below:

\[
F_{\alpha}(e_1) = \{(c_1, 0.5, 0.8), (c_2, 0.3, 0.4), 0.3\}
\]
\[
F_{\alpha}(e_2) = \{(c_1, 0.6, 0.7), (c_2, 0.1, 0.9), 0.5\}
\]
\[
F_{\alpha}(e_3) = \{(c_1, 0.4, 0.6), (c_2, 0.5, 0.6), 0.4\}
\]
\[
F_{\alpha}(e_4) = \{(c_1, 0.4, 0.7), (c_2, 0, 0.8), 0.6\}
\]
\[
F_{\alpha}(e_5) = \{(c_1, 0.5, 0.5), (c_2, 0.1, 0.9), 0.2\}
\]
\[
F_{\alpha}(e_6) = \{(c_1, 0.7, 0.9), (c_2, 0.2, 0.8), 0.7\}
\]

2. The truth- membership function \( \check{t}_{ck} = a_i + b_i - a_i b_i \)

\[
\text{Where } a_i = t_{ck}(e_i) , \ i = 1, 2, \ldots, 6 \quad \text{K=1,2}
\]

\[
\text{and } b_i = \alpha(e_i)
\]

The false- membership function

\[
1 - \check{f}_{ck}(e_i) = d_i f_i \quad \text{where } d_i = 1 - f_i
\]

\[
\text{and } f_i = \alpha(e_i)
\]
To determine the high truth-membership value and low false–membership value we use $t_{c_k}(e_i)$ and $1 - t_{c_k}(e_i)$ respectively to get the soft vague set $F_{\alpha} (e_i)$ below:

$$F_{\alpha} (e_1) = \{(c_1, 0.65, 0.24), (c_2, 0.51, 0.12), 0.3\}$$

$$F_{\alpha} (e_2) = \{(c_1, 0.80, 0.35), (c_2, 0.55, 0.45), 0.5\}$$

$$F_{\alpha} (e_3) = \{(c_1, 0.56, 0.24), (c_2, 0.66, 0.24), 0.4\}$$

$$F_{\alpha} (e_4) = \{(c_1, 0.76, 0.42), (c_2, 0.6, 0.8), 0.6\}$$

$$F_{\alpha} (e_5) = \{(c_1, 0.6, 0.1), (c_2, 0.28, 0.18), 0.2\}$$

$$F_{\alpha} (e_6) = \{(c_1, 0.91, 0.63), (c_2, 0.76, 0.56), 0.7\}$$

3. The representation of the truth-membership function and the false–membership function are as in the tables (1) and (2) respectively.

4. Calculate the comparison table which is a square table (i.e. the number of rows and columns are equal) and both are labeled by the object name of the universe $X= \{c_1, c_2\}$. The entries $k_{ij}$ represent the number for which $c_i$ greater than or equal to the value of $c_j$ as shown in the table (3), (4).

5. Calculate the truth-membership score and false-membership score as shown in tables (5) and (6).

**CONCLUSION**

In our study, some definitions are recalled to use them to introduce the definition of soft generalized vague set, and some operations on soft generalized vague set like subset, equality, null set, union, intersection, OR and AND operations. An Illustrative example as an application in medical diagnosis is presented.

**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, Babylon University, Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**


Study the Effect of Some Hormones on Type of Labor

Rafeda M.AL-Amiri 1, Hanaa S.Khadum2, Awatif H.Issa3
1Basrah University /College of Dentistry /Department of Basic Science, Iraq, 2Basrah University/College of Science/ Department of Pathological Analysis, Iraq, 3Basrah University/College of Science/ Department of Pathological Analysis, Iraq

ABSTRACT

Labor is the process by which the fetus is expelled from the uterus; it requires regular, effective contractions that lead to dilation and effacement of the cervix. Endocrine changes during pregnancy female sex hormones (Estrogen, Progesterone, and human Gonadotrophin). These hormones are responsible for most of the physiologic changes during pregnancy and labor, and other hormones such as Oxytocin, Prolactin, and Leptin. A (4ml) blood sample was collected by test tubes were used and then serum for measuring the hormones by ELISA. Oxytocin hormone was significantly increased in caesarean section group; Hormones have no significant differences in age with birth type. And caesarean section obese group showed a significantly lower level of oxytocin.

We conclude that the Oxytocin hormone was increased in the caesarean section group and serum Oxytocin level decreased with the increase of body mass index, there is an inverse correlation between Oxytocin and Leptin hormones in the three groups of delivery.

Keyword: caesarean section, labor, sex hormones, Oxytocin and Leptin

INTRODUCTION

Pregnancy is the most important event in the life of any female organism to reproduce its progeny. It is a very coordinated process among the mammalian species involving reproductive organs and hormones. Labor is a clinical diagnosis. The onset of labor is defined as regular, painful uterine contractions resulting in progressive cervical effacement and dilatation. Cervical dilatation in the absence of uterine contraction suggests cervical insufficiency, whereas uterine contraction without cervical change does not meet the definition of labor. Labor is the process by which the fetus is expelled from the uterus. More specifically, it requires regular, effective contractions that lead to dilation and effacement of the cervix. Overall, consistent and coherent evidence from physiologic understandings and human and animal studies find that the innate hormonal physiology of childbearing has significant benefits for mothers and babies. Endocrine changes during pregnancy female sex hormones (i.e., estrogen, progesterone, and human gonadotrophin) are secreted primarily by the placenta. These hormones are responsible for most of the physiologic changes during pregnancy and labor, and other hormones such as Oxytocin, Prolactin, and Leptin. Labor can be divided into three types: Normal labor, Induced labor and caesarean section. Normal labor a spontaneous vaginal delivery (SVD) occurs when a pregnant female goes into labor without the use of drugs or techniques to induce labor. Caesarean sections defined as the use of surgery to deliver one or more babies. Oxytocin is a hypothalamic neuropeptide first recognized as a regulator of parturition and lactation which has recently gained attention for its ability to modulate social behaviors. Our own in vitro studies have suggested a role for Prolactin and also human chorionic gonadotropin in the secretion of Prostaglandin by the fetal membranes that are associated with the regulation of labor. Thus, phasic changes in maternal Prolactin during this time may represent an important endocrine event in the initiation and/or the progression of labor. A recent study has indicated that Prolactin inhibits Prostaglandin production from the human fetal membranes.
membranes. Prolactin levels are reduced significantly in both amniotic fluid and decidua after the onset of labor, thus providing evidence for a role of Prolactin in human parturition. The progesterone secreted in significant amounts only during the latter half of each ovarian cycle, when secreted by the corpus luteum in the normal no pregnant female. Also, the tremendous amount of progesterone promotes the events leading to parturition. Since the rate of caesarean section increased in previous years. This study aims to research on the causes of increased incidence of obstetrics labor in women and the increasing rate of cesarean deliveries at present time and clarifying the role of hormones between the two groups of women who deliver by normal and caesarean section. Therefore the study is designed to achieve the following objectives: Measurement the level of Oxytocin, Progesterone, Estrogen Leptin and Prolactin hormones). Because they are considered important factors on the delivery, we want to know whether these factors influence the determination of the type of birth in women who have a normal delivery or caesarean section.

**MATERIALS AND METHOD**

This is a cross-sectional study carried out at Al-Basrah Teaching Hospital for Maternity and Childhood in Basrah city of Iraq from October 2017 until February 2018. An 86 pregnant female were included in this study (32) were delivered by caesarean section, (29) by normal delivery and (25) by induced labor. A (4ml) blood sample was collected from each pregnant female at the time of admission by test tubes were used and then left for some short time to let blood clot and then serum samples were obtained by centrifugation at room temperature at 3500 rpm for 10 minutes for measuring the hormones by ELISA. Statistical package for social science (SPSS) version 20 was used to analyze the data T-test.

**Study Design**

Women were divided according to their ages into three groups. The first group was 18-25 years, the second group was 26-32 years and the third group was 33-40 years. BMI was calculated as Body Mass Index=Weight (kg) / height (m2). Pregnant women were divided into three groups, normal (≤ 25kg), overweight (25-30kg) and Obese (≥30kg). Gestational age was determined as the period from the date of the woman’s last menstrual period, and correlated with ultrasound reports that pregnant women had.

**RESULTS AND DISCUSSION**

As shown in table (1), it appeared that Oxytocin hormone was significantly increased in caesarean section group, while Prolactin, Progesterone, and Leptin hormones were not significantly decreased in caesarean section group in comparison with induced and normal labor groups. On the other hand, data referred that Estrogen also not significantly decreased in the normal group in comparison with induced and caesarean section groups. Caesarean section A3 group showed no significant higher level of Oxytocin but induced labor A3 group showed no significant lower level of prolactin and leptin in comparison with normal labor and caesarean section but it appeared no significantly higher level of progesterone. While no significant variation was recorded in the level of estrogen between normal, induced and caesarean section A3 group Table (2). As shown in (Table 3) in the comparison between normal, induced and caesarean section groups, it appeared that normal labor normal weight group showed a significantly higher level of oxytocin and caesarean section overweight group showed a significantly higher level of oxytocin, while a caesarean section obese group showed a significantly lower level of oxytocin in comparison with normal and induced labor obese group. The result of the present study showed that the caesarean section group had significantly higher Oxytocin concentration than induced and normal labor groups. However, many studies are known about the role of this hormone during pregnancy and labor. Several studies concerning Oxytocin in pregnancy and labor have been published, this result was agreement with which she said that the plasma Oxytocin concentration was higher in week 36 than at the beginning of parturition and did not change during the phases of labor. Because of the effects of estrogen, the uterine Oxytocin receptor population density increases progressively during pregnancy to reach a peak at term. Therefore, the uterus becomes very sensitive to the effects of Oxytocin while preparing for parturition. This could explain the increased oxytocin level that was observed in our study. However, a comparison of three age groups of Caesarean section group (≤ 25 years, 26-33 years and ≥ 34 years), showed
no significant differences in all studied parameters which included Oxytocin, Prolactin, Progesterone, Estrogen and Leptin in comparison with three age groups of induced and normal labor groups. The findings of this study agreement with the study of 30. Despite the risks and prevalent use of Oxytocin, little is known about the association between oxytocin titration and maternal outcomes across BMI groups 31. In accordions with our study, more recently researchers evaluated Oxytocin requirements across BMI groups and found that oxytocin dosage increases with increasing BMI 32. Women who are obese are more likely to experience poor labor outcomes such as longer length of labor and cesarean birth 33. The present study demonstrated that the PRL level decreased with the increased BMI. Our data was agreement with 34 who’s suggested that high leptin levels are a possible cause of the peripheral and central PRL resistance presented by obese animals which leads to impaired lactation performance, so they found reduced milk production and offspring viability.

Table (1): Hormonal parameters of normal labor, induced labor and caesarean section regardless of age and BMI categories.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Normal Labor N=29</th>
<th>Induced Labor N=25</th>
<th>Caesarean Section N=32</th>
<th>P.Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxytocin</td>
<td>369.84±22.11</td>
<td>367.32±21.04</td>
<td>427.81±16.01</td>
<td>0.048*</td>
</tr>
<tr>
<td>Prolactin</td>
<td>146.67±29.43</td>
<td>140.16±31.05</td>
<td>135.96±34.5</td>
<td>0.43</td>
</tr>
<tr>
<td>Progesterone</td>
<td>74.97±5.75</td>
<td>76.37±3.07</td>
<td>73.01±8.48</td>
<td>0.14</td>
</tr>
<tr>
<td>Estrogen</td>
<td>2723.5±401.09</td>
<td>2853.8±130.53</td>
<td>2845.5±80.8</td>
<td>0.09</td>
</tr>
<tr>
<td>Leptin</td>
<td>522.5±360.6</td>
<td>597.7±357.0</td>
<td>512.6±293.5</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Table (2): Hormonal parameters of, normal labor, induced labor and caesarean section groups. (Ages ≤ 25 years, Ages 26-33years and Age ≥34 group).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Normal Labor N=29</th>
<th>Induced Labor N=25</th>
<th>Caesarean Section N=32</th>
<th>P_Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age≤25 Years groupA1 (N=19)</td>
<td>349.58±24.24</td>
<td>146.290±7.593</td>
<td>42.55±40.52</td>
<td>0.917</td>
</tr>
<tr>
<td>Age≥26-33 Years groupA2 (N=6)</td>
<td>357.85±27.49</td>
<td>153.705±16.107</td>
<td>422.60±7.390</td>
<td>131.774±8.934</td>
</tr>
<tr>
<td>Age≥24 Years groupA3 (N=4)</td>
<td>389.30±51.42</td>
<td>76.54±3.731</td>
<td>74.844±7.429</td>
<td>151.593±14.069</td>
</tr>
<tr>
<td>Progesterone</td>
<td>74.501±1.482</td>
<td>77.997±2.638</td>
<td>72.659±3.231</td>
<td>71.271±1.792</td>
</tr>
<tr>
<td>Prolactin</td>
<td>146.290±7.593</td>
<td>153.705±16.107</td>
<td>422.60±7.390</td>
<td>0.917</td>
</tr>
<tr>
<td>Progesterone</td>
<td>74.501±1.482</td>
<td>77.997±2.638</td>
<td>72.659±3.231</td>
<td>71.271±1.792</td>
</tr>
<tr>
<td>Estrogen</td>
<td>2762.71±58.899</td>
<td>2548.51±102.016</td>
<td>2809.51±124.943</td>
<td>2859.80±69.306</td>
</tr>
<tr>
<td>Leptin</td>
<td>549.086±78.740</td>
<td>536.691±171.609</td>
<td>644.106±78.740</td>
<td>491.169±95.192</td>
</tr>
</tbody>
</table>
Table (3): Hormonal parameters of, normal labor, induced labor and caesarean section groups. According to different body mass index categories.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Normal Labor</th>
<th>Induced Labor</th>
<th>Caesarean Section</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal weight (≤24.9)</td>
<td>Over weight (25-29.9)</td>
<td>Obese (≥ 30)</td>
</tr>
<tr>
<td></td>
<td>(N=29)</td>
<td>(N=6)</td>
<td>(N=22)</td>
</tr>
<tr>
<td>Oxytocin</td>
<td>452.6±38.83</td>
<td>428.03±67.21</td>
<td>347.27±20.26</td>
</tr>
<tr>
<td>Prolactin</td>
<td>154.6±6.80</td>
<td>151.04±31.17</td>
<td>118.10±12.72</td>
</tr>
<tr>
<td>Progesterone</td>
<td>71.29±5.50</td>
<td>77.01±2.65</td>
<td>74.58±1.38</td>
</tr>
<tr>
<td>Estrogen</td>
<td>2897.8±240.60</td>
<td>2448.56±98.22</td>
<td>2793.75±52.50</td>
</tr>
<tr>
<td>Leptin</td>
<td>225.8±337.06</td>
<td>390.08±137.60</td>
<td>572.17±71.86</td>
</tr>
</tbody>
</table>

CONCLUSION

We conclude that the Oxytocin hormone was increased in the caesarean section group and serum Oxytocin level decreased with the increase of body mass index, there is an inverse correlation between Oxytocin and Leptin hormones in the three groups of delivery.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Basrah University /College of Dentistry /Department of Basic Science, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

The Role of Lewis Blood Type Molecules in Atopic Dermatitis

Khedhir Hassan Ali¹, Fatima Rammadan Abdul², Hanan Tariq Subhi³

¹Professor of Immunology and Microbiology, Mustansiriyah University, Baghdad, Iraq,
²Microbiology, Ph.D, Department of Biology; College of Science; Mustansiriyah University, Baghdad, Iraq,
³Microbiology, Ph.D, Department of Biology; Faculty of Health and Science; Koya University, Irbil, Iraq

ABSTRACT

This study aims to find if there is an association between AD disease and Lewis blood groups phenotypes in addition, isolation and frequency of *S. aureus* from skin and stool were studied also. Fifty patients of male and female genders were enrolled beside, a similar proportion of genders were included in 45 healthy controls. Lewis phenotypes were identified in red blood cells using hemagglutination testing while *S. aureus* was isolated using conventional bacteriological procedures. Anti-*S. aureus* antibodies were evaluated by using ELISA. The results revealed increased Lea frequency of 70% compared to 24.4% in controls (Z-test, P=2.28×10⁻⁵, 95% Cl =0.256-0.655). On the other hand, there was a marked decrease in Leb frequency approaching 8% compared to 48.9% in the controls (Z-test, P=3×10⁻⁵, 95% Cl =0.223-0.594). Le³a+b+ was doubled and there was no significant increase in Le⁴a-b-.

*S. aureus* were isolated from skin showed increased isolation frequency of patients 18% compared to nil isolation frequency of controls. Patients with AD of all Lewis blood types had increased in anti-*S. aureus* antibody titers compared to positive but low anti-bacterial antibody titers among controls.

Keywords: Lewis blood groups, atopic dermatitis, *Staphylococcus aureus*.

INTRODUCTION

Atopic dermatitis is a chronic skin inflammatory disease affecting mostly children and adolescent, commonly seen within first 2 years of life. The majority of this childhood disease persists in adulthood. A genetic factor is involved in its association with asthma and allergic rhinitis. In young children, the prevalence is estimated to be around 5-3% in adolescence. The risk of developing asthma in affected children vary from 25-80%. Prevalence of atopic dermatitis as well as allergic disease was linked with hygiene hypothesis. Which emphasize on the education of the innate immunity by microorganisms, and subsequent development of Th-1 type profile. Locking of exposure to microorganisms leads polarization to Th-2 responses that predispose to allergy. Nonetheless, Atopic dermatitis was reported to associated with perturb balance of intestinal microbiota. The best characterized bacterial pathogen associated with atopic dermatitis was *Staphylococcus aureus*. The prevalence of *S. aureus* skin colonization in healthy individuals is 5-3% compared to 75-100% rate in AD patients lesional skin and 30-100% in non lesional skin sites. Other study showed a colonization rate of *S. aureus* of 74.38 and 3% in acute, chronic skin lesion and control skin, respectively. The high rate colonization group showed increased IgE/eosinophilia. In this communication we sleeked to see if there is any association of atopic dermatitis with Lewis blood groups that usually used as ligand molecules in intestinal colonization.

MATERIALS AND METHOD

This study was conducted from October 2013 to May 2014 at Al-Sader general hospital in Baghdad, Iraq. Blood and sera samples were obtained from 50 untreated atopic dermatitis patients, besides 45 apparently healthy controls were enrolled also. The samples of patients and controls contained about equal number of males and females, their ages are represented in table (1). Routine tube hemagglutination test was performed for Lewis phenotypic determination, using monoclonal anti-Lewis typing antisera (Biotest, Germany). The serum
levels for anti- \textit{S. aureus} antibody determined by ELISA, bacterial glycan was used as a coated antigen and obtained as indicated in \cite{26}. Plates were coated with 50 \(\mu\)l of 0.05\% bovine serum albumin (BSA)– bicarbonate buffer. The plates were incubated overnight at 4\(^{\circ}\)C followed by serum samples diluted in saline used 50 \(\mu\)l sera aliquots were added to the plates and incubated for 1 hour at room temperature. Then 100 \(\mu\)l peroxidase –second antibody conjugation (Biokit, S.A.) was added to each well for 1 hour at 37\(^{\circ}\)C. The plates were washed three times with washing solution, 100\(\mu\)l of working substrate was added to each well in room temperature for 30 minute and terminated with adding 50\(\mu\)l of stop solution. Optical densities were read at 590 nm and the samples were processed in triplicate to derive mean ± SD. \textit{S. aureus} were isolated from the patient’s skin using saline –wetted swab, While aliquots of stool were homogenized in sterile saline to examination for the bacterium isolate. swab sample were cultured on mannitol salt agar, presumptive \textit{S.aureus} was finally diagnosed using VITEK-2 system. The bacteria were maintained on slant of trypticase soya agar unless otherwise indicated.

**RESULTS AND DISCUSSION**

**Study population**

The total number of atopic dermatitis patients in this study was 50 composed of 20 males and 30 females with a ratio 5:1. The mean age of males patients were 13.33±7.41, While the mean age of females were 12.33±5.89. Statistically, no significant differences of results between mean (\(p\)≤0.05). In addition, 45 apparently healthy controls from Baghdad area composed of 19 males and 26 females with a males : females ratio (37:1).The mean age of males control were 15.74 ±6.40 and the mean age of females was 14.23± 4.82. The demographic data represent ethnically undefined sample, but the majority were Arabs. We analyzed the presence of \textit{S.aureus} sampled from skin and stool and the frequencies of Lewis blood group phenotypes. The presence of anti- bacterium antibodies was assessed also. The demographic data of the studied population is depicted in table (1). Sex number in males and females were analyzed using chi-square statistical analysis of case – control didn’t show any differences at \(p\)≤0.05. Likewise age differences were analyzed using student t-test with no statistical differences at \(p\)≤ 0.05. In this instance fucosyltransferases enzymes responsible for Lewis blood groups molecules synthesis showed a tendency of inactivation by mutation that depends on race \cite{6}. The ratio of females to males did not show noticeable deviation, seen in many autoimmune disease with a tendency of high proportion females affected \cite{30}.

**Association of Lewis blood groups with atopic dermatitis**

In table (2) indicated that the frequency of the Le\(^a\) phenotype in patients were 70\% compared to 24.4\% in controls (\(p= 2.28\times 10^{-5}, Cl=0.256-0.655\)). On the other hand however, Le\(^b\) in patients significantly showed a decreased in its frequency reaching 8\% compared to 48.9\% in control groups (\(p= 3\times10^{-5}, Cl=0.223-0.594\), Le\(^{ab}\) was doubled in patients (4\%) as compared to controls (8.9\%) (\(p= 0.05, Cl=0.071-0.169\)). The double negative group didn’t give any significant difference 18\% in patients versus 17.8\% in controls (\(p= 1.0, Cl= - 0.173-0.1 77\)). Percentage of patients and controls were analyzed using Z-test for comparison of proportion.

1- \(p= 2.28\times 10^{-5}, 95\%, Cl=0.256-0.655\).
2- \(p= 3\times10^{-5}, 95\%, Cl=0.223-0.594\).
3- \(p= 0.05, 95\%, Cl=0.071-0.169\).
4- \(p= 1.0, 95\%, Cl= - 0.173 -0.177\).

As the result showed, Le\(^a\) was the most susceptible in patients with atopic dermatitis compared to group Le\(^b\) and Le\(^{ab}\). In this instance Lewis blood groups were implicated as ligands for microbial colonization including bacteria \cite{9,18}. Atopic dermatitis is a multifactorial based disease, the role of increased \textit{S. aureus} colonization in skin of patients was reported \cite{23,7}. The prerequisite of ligand among Le\(^a\) type patients is highly appreciated in atopic dermatitis and this connection in fact require in depth investigations.

**Bacterial isolation**

This study showed that \textit{Staphylococcus aureus} was isolated in increasing frequency, as shown in the table (3). The frequency of isolation of this bacterium from patients skin gave 4\% compared to nil isolation frequency in controls subjects. In addition the microorganism was isolated from stool at 25\% frequency compared to zero isolation from controls, a notion that might strengthen the involvement of the bacterium and it’s stool reservoir in the pathogenesis of the disease. Numerous studies showed association between \textit{S. aureus} that secreted super antigenic enterotoxin with skin patients and IL4 level, in addition to IgE antibodies level in AD patients serum \cite{15,3,1}.
S. aureus was linked with the immune pathogenesis of the inflammatory cascades of the disease⁴,⁷,¹.

**Anti-Staphylococcus aureus antibodies**

To strengthen the association of the bacterium with atopic dermatitis, anti-Staphylococcus aureus antibody value was compared in patients and controls. Most Lewis blood groups Le⁺, Le⁻, Le⁺⁻ showed the presence of anti-bacteria antibody compared to controls (Table 4). No statistical differences were observed at p≤ 0.05 (Z-test for proportion). Positive and negative presence of anti-bacterial antibody was determined based on a cut-off value of 0.135 in anti-S. aureus ELISA. But, there was noticeable increase in the level of these antibodies among patients. The mean level of anti-bacterial antibody in Lewis patients was 1.79 ± 0.5 determined as O.D values of diluted sera, compared to a mean of 0.62 ± 0.41 in Lewis controls (p= 6.31×10⁻¹⁰, CI=0.884 – 1.469).(Figure 1) and healthy controls. Mean O.D was derived from positive values above the cut-off value of 0.135. Differences between patients and controls was statistically highly significant (p= 6.3 X 10⁻¹⁰). Other groups of patient’s demonstrated increased antibody mean values compared to controls as well (Figure 2). The increased prevalence of Le⁺ carrying patients and increased S. aureus prevalence and their increased antibodies implicate these as part of the multifactorial basis of the penetrance of and susceptibility to the disease.

**Table 1: Demographic data of atopic dermatitis patients and controls.**

<table>
<thead>
<tr>
<th>Characters</th>
<th>Patients</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>Sex</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Age</td>
<td>13.33±7.41</td>
<td>12.33±5.89</td>
</tr>
</tbody>
</table>

**Table 2: Frequency distribution of Lewis blood groups in atopic dermatitis patients and apparently healthy controls**

<table>
<thead>
<tr>
<th>Lewis type</th>
<th>Frequency %</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Patients</td>
</tr>
<tr>
<td>Le⁺</td>
<td>35</td>
<td>70(¹)</td>
</tr>
<tr>
<td>Le⁻</td>
<td>4</td>
<td>8(²)</td>
</tr>
<tr>
<td>Le⁺⁻</td>
<td>2</td>
<td>4(³)</td>
</tr>
<tr>
<td>Le⁺⁻⁻</td>
<td>9</td>
<td>18(⁴)</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3: Isolation frequency of Staphylococcus aureus from skin and stool samples of atopic dermatitis patients and apparently healthy controls.**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Isolation frequency %</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patients</td>
<td>Controls</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Positive</td>
</tr>
<tr>
<td>Skin</td>
<td>50</td>
<td>9</td>
</tr>
<tr>
<td>Stool</td>
<td>25</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 4: Anti- *Staphylococcus aureus* antibody positivity in atopic dermatitis different Lewis groups type of patients and apparently healthy controls.

<table>
<thead>
<tr>
<th>Lewis types</th>
<th>Patients</th>
<th>%</th>
<th>Controls</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Le^a</td>
<td>11/12</td>
<td>91.67</td>
<td>6/9</td>
<td>66.67</td>
</tr>
<tr>
<td>Le^b</td>
<td>4/4</td>
<td>100</td>
<td>8/12</td>
<td>66.67</td>
</tr>
<tr>
<td>Le^a+b+</td>
<td>2/2</td>
<td>100</td>
<td>3/4</td>
<td>75</td>
</tr>
<tr>
<td>Le^a-b-</td>
<td>2/9</td>
<td>22.2</td>
<td>4/8</td>
<td>50</td>
</tr>
</tbody>
</table>

**CONCLUSION**

We conclude that there is a highly significant association between Lewis (a) blood groups with atopic dermatitis and involvement of Lewis blood groups molecules in the pathogenesis of the disease.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**


2. Ahmed T, Lundgren A, Arifuzzaman M, Qadri F, Teneberg S and Svennerholm AM. Children with the Le(a+b-) blood groups have increased susceptibility to diarrhea caused by enterotoxigenic Escherichia coli expressing colonization factor1 group fimbrae. Inf. Immun., 2009; 77: 2059-2064.


7. Breuer K, Wittmann M, Bösche B, Kapp A,


17. Patrick MS, Laura CC, Kristi LS, Bea BA and Donald YML. Superantigen Profile of Staphylococcus aureus Isolates from Patients with Steroid-Resistant Atopic Dermatitis, Clin Infect Dis. 2008; 15, 46(10): 1562–1567.


Breastfeeding and Its Effect on Fetal Health from the First Hour of a Baby’s Life

Amean A. Yasir
Community Health Nursing, Dean of Nursing College/ University of Babylon, Iraq

ABSTRACT

Breast milk provides all of the nutrients an infant needs for the first six months. Additionally, it has immunological properties that protect infants against common diseases, such as diarrhea and pneumonia, which are important causes of infant morbidity and mortality. Breastfeeding also presents advantages to the mother’s health, increasing the postpartum infertility period, helping them return to their pregestational weight, and reducing their risk of developing breast. Despite its recognized benefits, the practice of breastfeeding, in the majority of countries, is still below the recommended by the World Health Organization (WHO). Regarding promotion of breastfeeding, the WHO recommends placing newborns in direct contact with their mothers immediately after birth for at least one hour, and encourage the mother to initiate breastfeeding as soon as the newborn is ready, offering help if necessary. This recommendation is based on the newborn’s stronger aptitude in spontaneously searching for the nipple area and initiating breastfeeding during this period, contributing to the establishment of exclusive maternal breastfeeding. Breastfeeding in the first hour of life is associated with prolonged duration of breastfeeding and reduction of infant mortality, especially in low-income countries.

Keywords: Breast Feeding, Infant, Newborn, importance of breastfeeding, fetal health.

INTRODUCTION

Breastfeeding also known as nursing, is the feeding of babies and young children with milk from a woman’s breast. Health professionals recommend that breastfeeding begin within the first hour of a baby’s life and continue as often and as much as the baby wants. During the first few weeks of life babies may nurse roughly every two to three hours. The duration of a feeding is usually ten to fifteen minutes on each breast. Older children feed less often. Mothers may pump milk so that it can be used later when breastfeeding is not possible. Breastfeeding has a number of benefits to both mother and baby, which infant formula lacks. Deaths of an estimated 820,000 children under the age of five could be prevented globally every year with increased breastfeeding. Breastfeeding decreases the risk of respiratory tract infections and diarrhea, both in developing and developed countries. Other benefits include lower risks of asthma, food allergies, celiac disease, type 1 diabetes, and leukemia. Breastfeeding may also improve cognitive development and decrease the risk of obesity in adulthood. Mothers may feel pressure to breastfeed, but in the developed world children generally grow up normally when bottle fed. Health organizations, including the World Health Organization (WHO), recommend breastfeeding exclusively for six months. This means that no other foods or drinks other than possibly vitamin D are typically given. After the introduction of foods at six months of age, recommendations include continued breastfeeding until at least one to two years of age. Globally about 38% of infants are only breastfed during their first six months of life. In the United States, about 75% of women begin breastfeeding and about 13% only breastfeed until the age of six months. Medical conditions that do not allow breastfeeding are rare. Mothers who take certain recreational drugs and medications should not breastfeed. Smoking, limited amounts of alcohol, or coffee are not reasons to avoid breastfeeding. Not all of breast milk’s properties are understood, but its nutrient content is relatively consistent. Breast milk is made from nutrients in the mother’s bloodstream and bodily stores. Breast milk has an optimal balance
of fat, sugar, water, and protein that is needed for a baby’s growth and development. Breastfeeding triggers biochemical reactions which allows for the enzymes, hormones, growth factors and immunologic substances to effectively defend against infectious diseases for the infant. The breastmilk also has long-chain polyunsaturated fatty acids which help with normal retinal and neural development. The composition of breast milk changes depending on how long the baby nurses at each session, as well as on the child’s age. The first type, produced during the first days after childbirth, is called colostrum. Colostrum is easy to digest although it is more concentrated than mature milk. It has a laxative effect that helps the infant to pass early stools, aiding in the excretion of excess bilirubin, which helps to prevent jaundice. It also helps to seal the infants gastrointestinal tract from foreign substances, which may sensitize the baby to foods that the mother has eaten. Although the baby has received some antibodies through the placenta, colostrum contains a substance which is new to the newborn, secretory immunoglobulin A (IgA). IgA works to attack germs in the mucous membranes of the throat, lungs, and intestines, which are most likely to come under attack from germs. Breasts begin producing mature milk around the third or fourth day after birth. Early in a nursing session, the breasts produce foremilk, a thinner milk containing many proteins and vitamins. If the baby keeps nursing, then hindmilk is produced. Hindmilk has a creamier color and texture because it contains more fat. According to some authorities, increasing evidence suggests that early skin-to-skin contact (also called kangaroo care) between mother and baby stimulates breastfeeding behavior in the baby. Newborns who are immediately placed on their mother’s skin have a natural instinct to latch on to the breast and start nursing, typically within one hour of birth. Immediate skin-to-skin contact may provide a form of imprinting that makes subsequent feeding significantly easier. In addition to more successful breastfeeding and bonding, immediate skin-to-skin contact reduces crying and warms the baby. According to studies cited by UNICEF, babies naturally follow a process which leads to a first breastfeed. Initially after birth the baby cries with its first breaths. Shortly after, it relaxes and makes small movements of the arms, shoulders and head. The baby crawls towards the breast and begins to feed. After feeding, it is normal for a baby to remain latched to the breast while resting. This is sometimes mistaken for lack of appetite. Absent interruptions, all babies follow this process. Rushing or interrupting the process, such as removing the baby to weigh him/her, may complicate subsequent feeding. Activities such as weighing, measuring, bathing, needle-sticks, and eye prophylaxis wait until after the first feeding. The positive effects of breastfeeding on the newborn’s health can be attributed to the components of breast milk, as well as the contact between mother and baby. The colostrum, milk on its first days, contains the epidermal growth factor, which accelerates the development of the intestinal mucus, as well as the immunological bioactive factors that provide immunological protection to the newborns, preventing intestinal colonization by pathogenic microorganisms.

MATERIALS AND METHOD

Formula and pumped breastmilk, side-by-side. Note that the formula is of uniform consistency and color, while the milk exhibits properties of an organic solution, separating into the creamline layer of fat at the top, milk and a watery blue layer at the bottom. Breast milk may be kept at room temperature for up to six hours, refrigerated for up to eight days or frozen for six to twelve months. Research suggests that the antioxidant activity in expressed breast milk decreases over time, but remains at higher levels than in infant formula.

Mothers express milk for multiple reasons:

- Expressing breast milk can maintain a mother’s milk supply when she and her child are apart.
- A sick baby who is unable to nurse can take expressed milk through a nasogastric tube.
- Some babies are unable or unwilling to nurse.
- Expressed milk is the feeding method of choice for premature babies.
- Viral disease transmission can be prevented by expressing breast milk and subjecting it to Holder pasteurization.
- Some women donate expressed breast milk (EBM) to others, either directly or through a milk bank.

This allows mothers who cannot breastfeed to give their baby the benefits of breast milk.

Shared nursing

It is not only the mother who may breastfeed her
child. She may hire another woman to do so (a wet nurse), or she may share childcare with another mother (cross-nursing). Shared breastfeeding is a risk factor for HIV infection in infants (Main article: Wet nurse)

**Tandem nursing**

It is possible for a mother to continue breastfeeding an older sibling while also breastfeeding a new baby; this is called tandem nursing. During the late stages of pregnancy, the milk changes to colostrum. While some children continue to breastfeed even with this change, others may wean. Most mothers can produce enough milk for tandem nursing, but the new baby should be nursed first for at least the first few days after delivery to ensure that it receives enough colostrum.

Breastfeeding triplets or larger broods is a challenge given babies’ varying appetites. Breasts can respond to the demand and produce larger milk quantities; mothers have breastfed triplets successfully.

**Induced lactation**

Induced lactation, also called adoptive lactation, is the process of starting breastfeeding in a woman who did not give birth. This usually requires the adoptive mother to take hormones and other drugs to stimulate breast development and promote milk production. In some cultures, breastfeeding an adoptive child creates milk kinship that built community bonds across class and other hierarchal bonds

**Re-lactation**

Re-lactation is the process of restarting breastfeeding. In developing countries, mothers may restart breastfeeding after a weaning as part of an oral rehydration treatment for diarrhea. In developed countries, re-lactation is common after early medical problems are resolved, or because a mother changes her mind about breastfeeding.

A WHO manual for physicians and senior health workers citing a 1992 source states: “If a baby has been breastfeeding sometimes, the breastmilk supply increases in a few days. If a baby has stopped breastfeeding, it may take 1-2 weeks or more before much breastmilk comes.

**Health effects:**

Support for breastfeeding is universal among major health and children’s organizations. WHO states, “Breast milk is the ideal food for the healthy growth and development of infants; breastfeeding is also an integral part of the reproductive process with important implications for the health of mothers.

Breastfeeding decreases the risk of a number of diseases in both mothers and babies. The US Preventive Services Task Force recommends efforts to promote breastfeeding.

**Growth**

The average breastfed baby doubles its birth weight in 5–6 months. By one year, a typical breastfed baby weighs about 2-1/2 times its birth weight. At one year, breastfed babies tend to be leaner than formula-fed babies, which improves long-run health.

The Davis Area Research on Lactation, Infant Nutrition and Growth (DARLING) study reported that breastfed and formula-fed groups had similar weight gain during the first 3 months, but the breastfed babies began to drop below the median beginning at 6 to 8 months and were significantly lower weight than the formula-fed group between 6 and 18 months. Length gain and head circumference values were similar between groups, suggesting that the breastfed babies were leaner.

**Infections**

Breast milk contains several anti-infective factors such as bile salt stimulated lipase (protecting against amoebic infections) and lactoferrin (which binds to iron and inhibits the growth of intestinal bacteria). Exclusive breastfeeding till six months of age helps to protect an infant from gastrointestinal infections in both developing and industrialized countries. The risk of death due to diarrhea and other infections increases when babies are either partially breastfed or not breastfed at all. Infants who are exclusively breastfed for the first six months are less likely to die of gastrointestinal infections than infants who switched from exclusive to partial breastfeeding at three to four months.

**Intelligence**

It is unclear whether breastfeeding improves intelligence later in life. Several studies found no relationship after controlling for confounding factors like maternal intelligence (smarter mothers were more likely to breastfeed their babies). However, other studies concluded that breastfeeding was associated with
increased cognitive development in childhood, although the cause may be increased mother–child interaction rather than nutrition.

**Mother**

Breastfeeding may improve a mother’s physical and emotional health.

**Maternal bond**

Hormones released during breastfeeding help to strengthen the maternal bond. Teaching partners how to manage common difficulties is associated with higher breastfeeding rates. Support for a breastfeeding mother can strengthen familial bonds and help build a paternal bond.

**Fertility**

Exclusive breastfeeding usually delays the return of fertility through lactational amenorrhea, although it does not provide reliable birth control. Breastfeeding may delay the return to fertility for some women by suppressing ovulation. Mothers may not ovulate, or have regular periods, during the entire lactation period. The non-ovulating period varies by individual. This has been used as natural contraception, with greater than 98% effectiveness during the first six months after birth if specific nursing behaviors are followed.

**Bleeding**

While breastfeeding soon after birth is believed to increase uterus contraction and reduce bleeding, high quality evidence to support this is lacking.

**Other**

It is unclear whether breastfeeding causes mothers to lose weight after giving birth. The National Institutes of Health states that it may help with weight loss. For breastfeeding women, long-term health benefits include reduced risk of breast cancer, ovarian cancer, and endometrial cancer. A 2011 review found unclear if breastfeeding affects the risk of postpartum depression. Other reviews found tentative evidence of a lower risk among mothers who successfully breastfeed.

**Diabetes**

Breastfeeding of babies is associated with a lower chance of developing diabetes mellitus type 1. Breastfed babies also appear to have a lower likelihood of developing diabetes mellitus type 2 later in life. Breastfeeding is also associated with a lower risk of type 2 diabetes among mothers who practice it.

**CONCLUSION**

The positive effects of breastfeeding on the newborn’s health can be attributed to the components of breast milk, as well as the contact between mother and baby. The colostrum, milk on its first days, contains the epidermal growth factor, which accelerates the development of the intestinal mucus, as well as the immunological bioactive factors that provide immunological protection to the newborns, preventing intestinal colonization by pathogenic microorganisms.

**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, Dean of Nursing College/ University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**


Detection of Human Papilloma Virus DNA among Patients with Gynecological and Breast Cancer

Ifad K. AL-Shibly1, Bushra J. Alrubaee1, Mays Hadi Jebur1

1College of Medicine, University of Babylon, Iraq

ABSTRACT

Objective: Detection of viral DNA from patients and sequencing analysis and NCBI data base registration of some HPV positive samples. DNA sequencing method was performed for confirmative genetic identification and phylogenetic tree analysis of HPV 16 genotype. The positive the PCR product of HPV L1 gene were sent to Macrogen Company in Korea for performed the DNA sequencing by AB DNA sequencing. The statistical analysis and data presentation in the present study was based on inclusion of 120 women with cancer (uterine, breast, ovarian and cervical) serving as a study group and 79 apparently healthy women serving as a control group. Overall 27 women with cancer out of 120 showed positive results, after PCR examination, accounting for 77.5 %. Out of those 27 women, 24 had HPV-16 serotype. Comparison of mean age between those women with positive HPV infection and those women who are negative for HPV revealed no significant difference (P = 0.229) and mean age was 56.11 ± 9.31 years versus 53.54 ± 9.85 years in both categories, respectively. We were able to isolate HPV-16 strain and after DNA sequencing we were able to both sketch the phylogenetic tree and register the strains in the gene bank.

Keywords: Breast cancer, Interleukin-12, Interleukin-33, Single nucleotide -polymorphism, Tumor stages Gynecological cancer, Breast cancer, HPV infection, HPV-16, SNP.

INTRODUCTION

Cancer arises from the transformation of normal cells into tumour cells in a multistage process that generally progresses from a pre-cancerous lesion to a malignant tumour. Cancer that start in a woman’s reproductive system are called gynaecological cancers. All women are at risk for gynecologic cancers, and risk increases with age. When gynecologic cancers are found early 19. Breast cancer is the most prevalent malignancy in women and its incidence is increasing worldwide. It has the highest death rate of any type of cancer in women. HPV DNA sequences have been isolated, suggesting a link exists between breast cancer and HPV is controversial 13. (HPV) is a group of viruses that are extremely common worldwide. HPV is mainly transmitted through sexual contact and most people are infected with HPV shortly after the onset of sexual activity. (HPV) infection in the female genital tract has been connected with specific sites: vagina, cervix, and epithelium—the stratified squamous epithelium, leading to epithelial cell proliferation and often malignancy 3.

MATERIALS AND METHOD

DNA Extraction

Genomic DNA from tissue samples were extracted by using gSYAN DNA mini kit extraction kit (Tissue protocol) Geneaid. USA. and extracted DNA samples were stored at −20 °C for further use.

Real-Time PCR master mix preparation

PCR master mix was prepared by using (NEXpro™ qPCR Master Mix (Probe) and this master mix done according to company instructions.

qPCR Thermocycler Conditions

qPCR thermocycler conditions were done by using Real-Time PCR thermocycler system.
Real-Time PCR Data analysis

Real-Time data analysis was performed by analysis of threshold cycle number (CT value) that presented the positive amplification in Real-Time PCR cycle numberces in variables were analyzed using Student’s t, ANOVA and χ2 tests as appropriate, and P-values of less than 0.05 were considered significant. The statistical analyses were performed using SPSS version 23.

DNA sequencing method

DNA sequencing method was performed for confirmative genetic identification and phylogenetic tree analysis of HPV 16 genotype. The positive the PCR product of HPV L1 gene were sent to Macrogen Company in Korea for performed the DNA sequencing by AB DNA sequencing system. The DNA sequencing analysis was conducted by using NCBI-BLAST Data analysis, Molecular Evolutionary Genetics Analysis version 6.0. (Mega 6.0) and Multiple sequence alignment analysis of the partial HPV L1 gene sequence based ClustalW alignment analysis and The evolutionary distances were computed using the Maximum Composite Likelihood method by phylogenetic tree UPGMA method.

Statistical Analysis:-

Differences in variables were analyzed using Student’s t, ANOVA and χ2 tests as appropriate, and P-values of less than 0.05 were considered significant. The statistical analyses were performed using SPSS version 23.

RESULTS AND DISCUSSION

The statistical analysis and data presentation in the present study was based on inclusion of 120 women with cancer (uterine, breast, ovarian and cervical) serving as a study group and 79 apparently healthy women serving as a control group. Breast cancer is the most malignant tumor affecting women globally. A common risk factor that may explain some shared aspects of pathogenesis among these tumors is the infection by one or more of HPV genotypes. Despite that, enough controversy about real association between certain HPV genotypes and specific kinds of female malignancies existed in the available published literatures; added to that the controversy about the exact mechanism by which these viruses can transform normal epithelial cells into malignant ones. For that reason, the main bulk of ongoing discussion will be directed to explain this complex relationship between HPV and the above listed women malignancies.

Prevalence rate of human papilloma virus in women with cancer

The prevalence rate of HPV infection in women with cancer was assessed using conventional polymerase chain reaction (PCR) technique, as shown in figure (1). The results of agarose gel electrophoresis in which positive results were observed at 450 bp with lanes (1-11). Overall 27 women with cancer out of 120 showed positive results, after PCR examination, accounting for 22.5 %. Out of those 27 women, 24 had HPV-16 serotype as shown in table (1). Comparison of mean age between those women with positive HPV infection and those women who are negative for HPV revealed no significant difference (P = 0.229) and mean age was 56.11 ± 9.31 years versus 53.54 ± 9.85 years in both categories, respectively. Identification of exact HPV serotype was based on quantitative PCR method.

Association between type of cancer and human papilloma virus infection

In order to study association between histological type of cancer and HPV infection a Chi-square test was carried out and the results are shown in table (2). Uterine cancer was seen in a total of 50 patients of whom 13 patients (26.0 %) were proved to harbor HPV genome. Breast cancer was seen in a total of 50 patients of whom 5 patients (10.0 %) were proved to harbor HPV genome. Cervical cancer was seen in a total of 10 patients of whom 9 patients (90.0 %) were proved to harbor HPV genome. Ovarian cancer was seen in a total of 10 and none of them carried HPV genome (0.0 %). Therefore, it appears that cervical cancer is the highest among histological types of cancer to be associated with HPV infection. The rate of HPV in patients with uterine cancer and breast cancer was much lower than that of cervical cancer. In statistical term these rate variations in HPV infection in relation to histological type of cancer were highly significant (P < 0.001) and the difference was in favor of cervical cancer. Our results hence showed that 26.0 % of uterine cancers are accompanied by HPV infection. One large meta-analysis have shown that he rate of detection of HPV infection in association with endometrial carcinoma was highly variable in different regions of the world. This meta-analysis gave results as low as 0 % and as high as
61.1%. It should be mentioned that this study was very informative since it included 29 studies\textsuperscript{17}. Our results showed that the prevalence rate HPV DNA in association with breast cancer was relatively high (10.0%). In one study the prevalence rate HPV DNA was detected in 4.3% of women with malignant breast lesion\textsuperscript{15}, this rate is lower than that obtained in our results. The rate was in the present study was higher than that found by\textsuperscript{(14)}, who stated that HPV DNA was seen in about 4.4 percent and 6.5 percent in Mexican and Korean women having malignant breast tumors. However, the rate of HPV infection in association with breast cancer as shown the findings from a meta-analysis on HPV DNA and sporadic breast malignant tumors, that was carried out by\textsuperscript{(12)}, was 32.42% in Asian women. This rate is higher than the rate obtained in our study. The reports by\textsuperscript{(10)} indicated that the main type of breast cancer associated with HPV infection was the invasive ductal carcinoma histological subtype, in accordance with the fact that most of our cases were of the invasive ductal subtype. In addition, our results showed that 90% of women with cervical cancer had HPV DNA. The rates of detection of HPV DNA in association with cervical cancer, according to WHO reports were as following: Canada (74.3%), Finland (88.5%), France (75.6%), Germany (76.8%), Italy (72.1%) and USA (76.6%). These rates, although being roughly less than that detected in the current study, they reflect very strong association between HPV and cervical cancer in women. In the Arab regions, the estimated prevalence rates of HPV in association with cervical cancer women were as following: in Kingdom of Saudi Arabia (92%)\textsuperscript{3}; Kuwait (89%)\textsuperscript{2}; Egypt (93.3%)\textsuperscript{1}; in Jordan (87.2%)\textsuperscript{(16)}; these rates are approximately to the rate of HPV detection in association with cervical cancer in women in the present study. Taking ovarian cancer into consideration, we found that no patient was positive for HPA DNA (0.0%). Our finding is similar to that reported by\textsuperscript{(9)} who stated that among 198 Danish women with various forms of ovarian cancer, the rate of detection of HPV DNA was almost 0%. In Iran, a study was conducted on 26 malignant ovarian epithelia tumors and revealed that the prevalence rate of HPV DNA was 0%, in accordance with the results obtained in our study\textsuperscript{7}. In addition, patients with breast cancer were grouped by the specific serologic HPV serotype into 5 patients (10.0%) as having HPV-16. Moreover, patients with cervical cancer were grouped by the specific serologic HPV serotype into 8 patients (80.0%) as having HPV-16. Added to that, patients with ovarian cancer were free of HPV-16. So our findings suggest that the high risk HPV-16 subtype was associated with uterine cancer (20%). In accordance with the results of the present study\textsuperscript{(8)} stated that the detection rate of HPV-16 was associated with endometrial adenocarcinoma. Moreover\textsuperscript{(18)}, gave nearly similar results to that obtained in the presents study as they stated that HPV-16 was (20%) associated with endometrial cervical adenocarcinoma. We also found that HPV-16 was associated with breast carcinoma subtype (10%). In accordance with the findings of the current study\textsuperscript{(6)} demonstrated that HPV-16 was association with breast cancer. In the current study, we were able to isolate HPV-16 DNA from samples of cervical carcinoma; however, HPV-16 was (80%). According to\textsuperscript{11}, in Iran, the most prevalent type of HPV was HPV-16 (56%) these findings support our observation that cervical carcinoma is associated with HPV-16.

**Gene bank registration and phylogenetic tree**

In the present study, we were able to isolate HPV-16 strain and after DNA sequencing we were able to both sketch the phylogenetic tree and register the strains in the gene bank, as shown in figure (3) and table (3).

**Table 1: Prevalence rate of human papilloma virus and its strains in study group**

<table>
<thead>
<tr>
<th>Human papilloma virus</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPV negative</td>
<td>93</td>
<td>77.5</td>
</tr>
<tr>
<td>HPV positive</td>
<td>27</td>
<td>22.5</td>
</tr>
<tr>
<td>HPV 16</td>
<td>23</td>
<td>19.2</td>
</tr>
</tbody>
</table>

**Table 2: Association between type of cancer and HPV infection**

<table>
<thead>
<tr>
<th>Type of cancer</th>
<th>Total</th>
<th>HPV positive cases</th>
<th>$\chi^2$</th>
<th>$p^*$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uterine</td>
<td>50</td>
<td>13</td>
<td>26.0</td>
<td></td>
</tr>
<tr>
<td>Breast</td>
<td>50</td>
<td>5</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>Cervix</td>
<td>10</td>
<td>9</td>
<td>90.0</td>
<td></td>
</tr>
<tr>
<td>Ovarian</td>
<td>10</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

* $\chi^2 < 0.001$  

$^*$ In HS
Table 3: NCBI BLAST Homology sequence identity

<table>
<thead>
<tr>
<th>NCBI BLAST HPV genotype 16 isolate</th>
<th>Genbank accession no.</th>
<th>NCBI BLAST Homology sequence identity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>HPV genotype 16 IQ-BC no.1 isolate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HPV genotype 16 IQ-BC no.2 isolate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HPV genotype 16 IQ-BC no.3 isolate</td>
</tr>
<tr>
<td>HPV-16</td>
<td>KU707602.1</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>HPV-16</td>
<td>KU707533.1</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99%</td>
</tr>
<tr>
<td>HPV-16</td>
<td>GQ479011.1</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99%</td>
</tr>
<tr>
<td>HPV-16</td>
<td>GQ479010.1</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99%</td>
</tr>
<tr>
<td>HPV-16</td>
<td>GQ479007.1</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99%</td>
</tr>
<tr>
<td>HPV-16</td>
<td>GQ465902.1</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99%</td>
</tr>
</tbody>
</table>

**CONCLUSION**

Overall 27 women with cancer out of 120 showed positive results, after PCR examination, accounting for 22.5%; HPV-16 was more associated with cancer. HPV was associated with malignant tumors as following: Cervical, uterine and breast; however, no association was found between ovarian cancer and HPV.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Medicine, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.
REFERENCES


Efficacy of Health Belief Model in Enhancing Exercise Behavior to Preventing Stroke among Geriatrics Homes Residents in Baghdad City

Mohmmed Q. Baktash¹, Arkan B. Naji²
¹College of Nursing, University of Mosul, Iraq, ²College of Nursing, University of Baghdad, Iraq

ABSTRACT

Stroke is the third leading cause of death in Iraq exceeding only by coronary heart disease and war related death. This study used a randomized controlled trial approach to investigate the efficacy of health belief model in enhancing exercise behaviors to preventing stroke among older people resident in the geriatric homes of Baghdad city. Ninety-seven seniors from Baghdad geriatrics homes participated in the study and randomly allocated into one of two groups, experimental (intervention group) and control (nonintervention group). We used a mixed design analysis of variance (ANOVA) to measuring the change among participant’s beliefs over three times (T1, T2, and T3). There was a significant improvement among participant’s beliefs about seriousness of stroke, $F(2, 94) = 8.408, P < 0.000$, their susceptibility to stroke $F(2, 94) = 12.578, P < 0.000$, and benefit of exercise in preventing stroke $F(2, 94) = 15.224, P < .000$ over times. However, the post-hoc procedure by using Bonferroni correction test indicated that this change in beliefs were attributed to the experimental group participants. In addition, there was a stable continuous correlation among experimental group participant’s beliefs about seriousness of stroke and benefit of exercise in preventing stroke.

Key words: Stroke, Health Belief Model, Exercise

INTRODUCTION

The article of heart disease and stroke statistics-2017 update; signaled that 10.3 million new cases of stroke were diagnosed in 2013 worldwide. The seriousness of stroke emerges not only out of its ability to kills its victims (the second leading cause of death worldwide), but also to its capacity to make permanent disability among its survivors. Concerning economic burden, it’s estimated that each stroke case cost approximately 140,000 United State dollars. Stroke is the third leading cause of death in Iraq exceeding only by coronary heart disease and war related death. The latest report published by World Health Organization (WHO) in 2017 indicated that stroke related death in Iraq reached 14,315 or 8.13% of country’s total deaths. Aging is the strongest determinant of stroke (approximately, over (75%) of stroke cases worldwide appear in people age more than 65 years). However, stroke is among a limited number of preventable disease. Studies reveal that there are more than 10 modifiable risk factors could be used to eliminate over (80%) of stroke causes. Among these factors, human exercise and physical activities are the essential one, this is because of its capability to influence a lot of other stroke risk factors such as obesity, hypertension, diabetes, dyslipidemia… etc. The Health Belief Model (HBM) is a psychological health behaviors change model developed in 1950 by some of United States (US) public health researchers with the purpose of improving human lifestyle toward healthy behaviors. (for more information about using of HBM see systematic review by).

Corresponding author:
Mohmmed Q. Baktash.
College of Nursing, University of Mosul, Iraq;
E-mail: M.gem87@yahoo.com.
METHODOLOGY

Design

This study used a randomized controlled trial approach to investigate the efficacy of health belief model in enhancing exercise behaviors to prevent stroke among older people resident in the geriatric homes of Baghdad city. The study included two groups; experimental (intervention group) and control (non-intervention group). The participants were randomly allocated into one of two groups.

Setting, Time and Ethical approval

The study was conducted in Iraq, Baghdad city at two nonprofit geriatrics homes (Al-AL-Rashad and Al-Sulaikh) from 4 March to 2 July 2018. Ethical approval for conducting the study were obtained from Baghdad governorate; Department of Special Needs and followed by the approval of the administrative managers of Baghdad geriatrics homes (Al-Rashad and Al-Sulaikh) (litter of approval number: 79 in 3 march 2018).

Sampling and Randomization

Because aging considers as a true risk factor for stroke (3). The target population for this study were the elderly people’s resident in geriatrics homes of Baghdad city. A sampling frim consisted of 135 seniors distributed at two geriatric homes in Baghdad city (97 seniors at Al-Rashad geriatric home and 38 seniors at Al-Sulaikh geriatric home). The exclusion criteria include those residents younger than 50 years old age or those with pervious history of stroke, and sever physical and psychological impairments. The final recruiting processes resulted in 97 seniors accepted to participate in the study. Randomization: after obtaining the informed consent from the participant, a simple randomization was conducted to allocating them into two groups: experimental (intervention), and control group (non-intervention). Each participant assigned specific number, and then the random allocation number generated by using Statistical Package for the Social Sciences (SPSS) software. Final step of this randomization resulted in 49 subject in experimental group (31 subject from Al-Rashad geriatric home and 18 subject from Al-Sulaikh geriatric home) and 48 subjects in control group (31 subject from Al-Rashad geriatric and 17 subject from Al-Sulaikh geriatric home).

Instrumentation and data collection

The data for this study were collected by using Cerebrovascular Attitudes and Beliefs Scale (CABS). This scale consists of two parts were designed to measuring the changes in the people’s beliefs about stroke over time and as follow (8):

Part 1: this part is designed to measures the participants socio-demographic characteristics, behavioral habits, and clinical history.

Part 2: This parts developed on the bases of health belief model and consisted of 28 items measured in 5 points Likert scale. However, for purpose of this study we selected only those items which measure the changes in exercise behavior (15) items. This scale included four major subscales: (1) perceived seriousness subscale and consisted of 3 items. (2) perceived susceptibility subscale and consisted of 3 items. (3) perceived benefit subscale and consisted of 4 items and (4) perceived barrier subscale and consisted of 5 items. Response for these items ranged from (1) strongly disagree to (5) strongly agree with higher score indicating higher perception of beliefs (Table 1). The required data obtained from the participant by interview method, at three times (Pretest; T1), (Posttest 1; T 2 immediately after 15 minutes from ending of health education session) and (Posttest 2; T 3 after two months from ending of health education session) and each interview takes about 4 to 10 minutes at each occasions.

Validity and reliability of instrument

The CABS demonstrated a good validity and reliability in a number of studies. However, for purpose of this study the validity of the questionnaire was tested by presenting it to (13) experts in nursing and medical fields. According to the expert’s recommendations some items were changed and other were modified. The reliability of the instrument was tested by using data from 10 seniors who were excluded from the study. Cronbach’s alphas were calculated to determine the internal consistency of the study instrument (Table 1). The overall internal consistency for the questionnaire was acceptable; $\alpha=0.79$

METHODOLOGY

Our health education about stroke takes about two hours at each selected geriatrics homes. The contents
of health education provided to the experimental groups through using lecture method with PowerPoint, data show device, figures and videos about stroke. The contents were organized in two parts and provided according to health belief model concepts. Specifically, the part one of lecture focused on three area related to stroke: (1) Pathophysiology of stroke and included definition, causes, types, and common signs and symptoms of stroke. (2) Susceptibility to stroke and included information about modifiable and unmodifiable stroke risk factors and what make some people susceptible to stroke than others. (3) Seriousness of stroke and involved information about stroke consequences and its severity. Part two: During this part, participants provided with information about measures that could protect them from stroke. However, the focus was made upon the benefits of exercise and maintaining normal body weight and how to eliminate the barriers to exercise.

Data analysis: We calculated mean, standard deviation, frequency and percentage to describing the participants of the study. Pearson chi-square and t-test were used to explore the homogeneity of characteristics between experimental and control groups at baseline test (T1). A mixed design analysis of variance (ANOVA) were used to measure changes in the health belief model concepts over three times (T1, T2, and T3) among groups. Finally, the Pearson correlation coefficient were used to calculate the liner correlation among health belief model concepts. Data were analyzed by using Statistical Package for Social Science (SPSS) for Windows Version 25.

RESULTS AND DISCUSSION

Baseline sample characteristics and homogeneity between groups

The study participants were 97 seniors between 50 - 85 years old, and the mean age was 66.40 (SD= 8.57). Regarding other demographic characteristics most of participant were overweight; M=26.57(SD=3.5), male (59.8%) and illiterate (25.77%) (Table 2). Concerning behavioral habits, despite the majority of participant stated that they are never smoked (48.5 %). However, the sedentary life style was common among participant (56.26%) (Table 2). Ultimately the descriptive statistics of participant’s clinical history revealed that the hypertension disease (51.54%), diabetes mellitus disease (50.51%) and hypercholesterolemia (38.14%) were the most prevalent clinical risk factors for stroke among participants (Table 2). Finally, there was no significant differences in the participant’s characteristics and / or score of beliefs between experimental and control groups at (T1) baseline test (Table 2).

Part II: Measuring Changes among Health Belief Model Concepts

The (table 3) shows that the M and SD of the four major health belief model concepts were changed among participant over times. To determine the significance of this changes in the mean scores and if our health education session based on HBM was successful in promoting enhancement among participant beliefs, we calculated a mixed design analysis of variance (ANOVA). For this analysis there was one between subject’s factor (group with two levels: Experimental [intervention] and control [non-intervention]) and one with in subject factor (time of testing with three levels: T 1, T 2, T 3). All effect reported as significant at P < 0.05. This test showed that the changes among beliefs mean scores is a result of time, not of condition (group) or interaction between time of test and types of groups. Specifically, there was significant main effect of time on participants perceived seriousness, F (2, 94) = 8.408, P < .000, perceived susceptibility, F(2,94)= 12.578, P<.000, and perceived benefit of exercise, F(2,94)= 15.224, P<.000 (Table 3). Indicating that participant’s beliefs about seriousness of stroke, susceptibility to stroke and benefit of exercise in preventing stroke were changed over time with smaller effect size for these beliefs [η2= 0.152, 0.211, 0.245], respectively. However, perceived barrier to exercise was the only variable that shows no significant change of score among participant’s over times F (2, 94) = 1.958, P > 0.05 (see Table 3). On the bases of this results, the post hoc procedure by using Bonferroni corrections test was conducted to determine where the differences among these beliefs exactly lies. The test revealed that the score of these three beliefs (seriousness, susceptibility and benefit) were differed significantly among experimental group over times (p<0.000). Concerning control group, the post hoc test revealed fluctuation of the beliefs mean score over times. However, no exact improvement or stable continuous significant change in score over time was observed (Table 4).
Part III: Correlations among four major health belief model concepts

The HBM hypothesized that the human behaviors are shaped by the association among four major beliefs of susceptibility, seriousness, benefit and barrier\(^{(6)}\). In order to testing this hypothesis, we calculated the Pearson correlation coefficient among these beliefs for each groups separately. All of beliefs among experimental group showed a high significant correlation with each other’s \((p < 0.000)\). However, the only continuous association over times was observed between seriousness of stroke and perceived benefit of exercise in preventing stroke (Table 5). Regarding control group, there was fluctuation in the correlation among beliefs. However, the association between seriousness and benefit was clearly significant at (T1) and (T3) (Table 5). Regarding characteristics of participants, some of results from (table 2) were consistent with the Iraqi ministry of health final report (2016).

**Table 1: Internal Consistency of the Study Instrument**

<table>
<thead>
<tr>
<th>Beliefs:</th>
<th>Items</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>perceived seriousness subscale</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>perceived susceptibility subscale</td>
<td>3</td>
<td>0.9</td>
</tr>
<tr>
<td>perceived benefit subscale</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td>perceived barrier subscale</td>
<td>5</td>
<td>0.7</td>
</tr>
</tbody>
</table>

**Table 2: Sample Characteristics and Homogeneity Between Experimental and Control Groups**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Experimental (n=49)</th>
<th>Control (n = 48)</th>
<th>Total (n=97)</th>
<th>t</th>
<th>(\chi^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropometric</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>66.51 ± 9.1</td>
<td>66.48 ± 7.66</td>
<td>66.40 ± 8.57</td>
<td>0.087</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>27.21 ± 4.04</td>
<td>25.92 ± 2.75</td>
<td>26.57 ± 3.5</td>
<td>1.830</td>
<td></td>
</tr>
<tr>
<td>Beliefs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Seriousness</td>
<td>3.51 ± 0.80</td>
<td>3.54 ± 0.69</td>
<td>3.52 ± 0.74</td>
<td>-0.206</td>
<td></td>
</tr>
<tr>
<td>Perceived Susceptibility</td>
<td>2.38 ± 0.65</td>
<td>2.42 ± 0.66</td>
<td>2.402 ± 0.65</td>
<td>-0.317</td>
<td></td>
</tr>
<tr>
<td>Perceived Benefit</td>
<td>2.97 ± 0.75</td>
<td>3.02 ± 0.65</td>
<td>3.00 ± 0.70</td>
<td>-0.323</td>
<td></td>
</tr>
<tr>
<td>Perceived Barrier</td>
<td>2.88 ± 0.53</td>
<td>3.01 ± 0.54</td>
<td>2.9 ± 0.53</td>
<td>-1.236</td>
<td></td>
</tr>
<tr>
<td>Characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td>0.084</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>30 61.2</td>
<td>28 58.3</td>
<td>58 59.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>19   38.8</td>
<td>20 41.7</td>
<td>39 40.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
<td></td>
<td>2.240</td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>14   28.6</td>
<td>11 22.9</td>
<td>25 25.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write and Read</td>
<td>5    10.2</td>
<td>8 16.7</td>
<td>13 13.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>12   24.5</td>
<td>11 22.9</td>
<td>23 23.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate school</td>
<td>11   22.4</td>
<td>12 25</td>
<td>23 23.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school and post graduate</td>
<td>7    14.28</td>
<td>6 12.5</td>
<td>13 13.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioral habits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
<td></td>
<td>1.245</td>
<td></td>
</tr>
<tr>
<td>Never smoked</td>
<td>28   57.1</td>
<td>22 45.8</td>
<td>50 51.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently smoker</td>
<td>16   32.7</td>
<td>20 41.7</td>
<td>36 37.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stopped smoking</td>
<td>5    10.2</td>
<td>6 12.5</td>
<td>11 11.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical activity</td>
<td></td>
<td></td>
<td></td>
<td>0.327</td>
<td></td>
</tr>
<tr>
<td>Sedentary (never)</td>
<td>30   62.5</td>
<td>28 57.1</td>
<td>58 59.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 days per week</td>
<td>18   36.73</td>
<td>21 43.75</td>
<td>39 40.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical History (diagnosed with)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family history of stroke</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TIA</td>
<td>8    16.3</td>
<td>9 18.8</td>
<td>17 17.52</td>
<td>0.099</td>
<td></td>
</tr>
</tbody>
</table>
## Table 3: Results of Mixed ANOVA and Descriptive Statistics Measuring Change in the Four Health Belief Model Constructs among Experimental Group (n=49) and Control Group (n=48) Over Times

<table>
<thead>
<tr>
<th>HBM Constructs</th>
<th>Groups</th>
<th>M (SD)</th>
<th>Pretest</th>
<th>Post 1</th>
<th>Post 2</th>
<th>Multivariate F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F(2, 94) = 8.408, p &lt; 0.000, η² = 0.152</td>
</tr>
<tr>
<td>Perceived Seriousness</td>
<td>Ex</td>
<td>3.51 (0.80)</td>
<td>3.94 (0.93)</td>
<td>3.88 (0.95)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co</td>
<td>3.54 (0.69)</td>
<td>3.70 (0.76)</td>
<td>3.60 (0.82)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Susceptibility</td>
<td>Ex</td>
<td>2.38 (0.65)</td>
<td>3.04 (1.32)</td>
<td>3.08 (1.35)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co</td>
<td>2.42 (0.66)</td>
<td>2.66 (0.96)</td>
<td>2.79 (1.11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Benefit</td>
<td>Ex</td>
<td>2.97 (0.75)</td>
<td>3.72 (1.17)</td>
<td>3.56 (1.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co</td>
<td>3.02 (0.65)</td>
<td>3.35 (0.76)</td>
<td>3.33 (1.05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Benefit</td>
<td>Ex</td>
<td>2.88 (0.53)</td>
<td>2.64 (0.72)</td>
<td>2.71 (0.71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co</td>
<td>3.01 (0.54)</td>
<td>3.03 (1.00)</td>
<td>2.95 (0.80)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Table 4: Post-hoc Test Using Bonferroni Corrections Procedure

<table>
<thead>
<tr>
<th>HBM Concepts</th>
<th>Groups</th>
<th>Post hoc Using Bonferroni</th>
<th>Pretest vs Post 1</th>
<th>Pretest vs Post 2</th>
<th>Post1 vs Post 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Severity</td>
<td>Ex</td>
<td>0.000</td>
<td>0.002</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co</td>
<td>0.352</td>
<td>1.000</td>
<td>0.863</td>
<td></td>
</tr>
<tr>
<td>Perceived Susceptibility</td>
<td>Ex</td>
<td>0.000</td>
<td>0.000</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co</td>
<td>0.289</td>
<td>0.047</td>
<td>0.386</td>
<td></td>
</tr>
<tr>
<td>Perceived Benefit</td>
<td>Ex</td>
<td>0.000</td>
<td>0.001</td>
<td>0.843</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co</td>
<td>0.079</td>
<td>0.124</td>
<td>1.000</td>
<td></td>
</tr>
</tbody>
</table>

## Table 5: Correlations among Four Major Health Belief Model Concepts for Experimental Group (n=49) and Control Group (n=48)

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (n=49)</th>
<th>Control group (n=48)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Belief</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Seriousness</td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>2. Susceptibility</td>
<td>0.001</td>
<td>0.344*</td>
</tr>
<tr>
<td>3. Benefit</td>
<td>0.503**</td>
<td>-0.169</td>
</tr>
<tr>
<td>4. Barrier</td>
<td>0.072</td>
<td>0.024</td>
</tr>
</tbody>
</table>
Cont... Table 5: Correlations among Four Major Health Belief Model Concepts for Experimental Group (n=49) and Control Group (n=48)

<table>
<thead>
<tr>
<th></th>
<th>Posttest 1 (T 2)</th>
<th></th>
<th>Post-2 test (T 2)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Seriousness</td>
<td>-0.624**</td>
<td>1. Seriousness</td>
<td>-0.530**</td>
</tr>
<tr>
<td></td>
<td>2. Susceptibility</td>
<td>0.700**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Benefit</td>
<td>0.579**</td>
<td>2. Susceptibility</td>
<td>-0.024</td>
</tr>
<tr>
<td></td>
<td>4. Barrier</td>
<td>-0.457**</td>
<td>3. Benefit</td>
<td>-0.360*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.580**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.394**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.394**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.045</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.241</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.254</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONCLUSION**

The findings of this study highlighted some of clinically important tips about preventing the most worldwide devastates disorder (stroke). The study revealed that the education could elicit significant improvement among senior’s beliefs toward stroke and demonstrated the continues association between perceived seriousness of stroke and benefits of exercise in preventing stroke.

**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 Mosul, Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**

Evaluation of Nurses’ Knowledge toward Abortion in Bint Al-Huda Teaching Hospital

Alaa M. Tuama¹, Wasan Raheem Mubarak², Ahmed Abdallah Abud³

¹University of Thi_Qar, Faculty of Nursing, Department of Community Nursing - Nasiriyah – IRAQ, ²University of Thi_Qar, Faculty of Medicine, Department of Gynecology, Nasiriyah – IRAQ, ³University of Thi_Qar, Faculty of Nursing, Department of pediatric nursing - Nasiriyah – IRAQ

ABSTRACT

Objective: To evaluate nurses’ knowledge toward abortion at Bint Al-Huda hospital in Thi-Qar governorate. A purposive “non-probability” sample of (100) nurses who were selected from Bint Al-Huda hospital in Thi-Qar governorate for the period from October 1st 2015 to June 8th of 2017. The study results indicated that more than half of the participants age is within 19-25 years-old (61%); less than half of them has 2-5 years of working in nursing (43%); whereas more than half of them report that their level of education is preparatory (67%); the majority of them live in urban areas (99%); and more than half of the participants’ monthly income is sufficient (54%), and the study subjects’ responses to the overall knowledge were high with score (89%). Initiating training program; especially; for newly working nurses that aim to increase their knowledge and Increase awareness and education for Nurses workers in hospitals through posters, seminars, and media.

Keywords: Nurses; Knowledge; Abortion

INTRODUCTION

A Abortion is the process of getting rid of pregnancy by ejecting the fetus before birth and called this process abortion. One of the causes of death for pregnant women who suffer from poor health is the abortion of about 13% of deaths according to statistics of the World Health Organization 1988. Abortion of sensitive matters is sometimes a condition of social and political matters and is often in total secrecy that can cause deterioration in health aspects. According to the World Health Organization, nearly 20 million unsafe abortions are performed worldwide each year and are major public health problems because they alone account for about 13% of the global decline in maternal mortality in developing countries. One of the most important ongoing discussions on Abortions in pregnancy are undesirable. Non-objection to women’s rights to health care is a cause of death in developing countries. An estimated 80,000 deaths worldwide are estimated annually from unsafe abortions, and over 99% of these deaths occur in developing countries in sub-Saharan Africa, Central and South-East Asia, and Latin America and the Caribbean. Abortion Women each year have an unwanted pregnancy.

Some unwanted pregnancies are transferred over the term, while others end up in spontaneous abortion that is rarely fatal and rarely presents complications, but others end up in induced abortion, which accounts for 19% of the medical causes of direct obstetric deaths in developing countries and millions of these are implemented outside the legal system, by unskilled providers. This abortion is unsafe and causes many risks to the health and life of women. In 2003, the World Health Organization (WHO) estimated that of 42 million pregnancies, 20 million had been done unsafe. The total number of unsafe abortions is increasing. This appears to be due to an increase in the number of fertile women rather than an increase in the rate, which is still stable at about 14 unsafe abortions per 1,000 women between the ages of 15 and 44 in the last 10 years. Most of these women are from developing countries. As a result of this unsafe abortion, 5 million women suffer from serious complications such as bleeding, septicemia, illness and disability for life. In addition, unsafe abortions lead to 50,000 deaths or more and leave 220,000 children without their mothers. To the risk of death, abortion causes risks such as bleeding, bacterial contamination,
uterine rupture, trauma, venous thrombosis, renal failure, permanent infertility, etc. Another factor of abortion is the untrained abortion technician in a place that is not subject to health and safety standards, putting pregnant women at risk of death. In legalizing abortion certain condition like culture, religion, educational status and poverty must be considered.

**METHODOLOGY**

A descriptive purposive “non-probability” study was carried out on 100 nurses who work at Bint Al-Huda hospital in Thi-Qar governorate for the period from October 1st 2015 to June 8th of 2017 were selected according specific criteria.

**Data Collection**

The data were collected through the questionnaire developed through the use of previous literature relevant to the subject of the study. The questionnaire was divided into two parts. The first part relates to demographic information such as sex, age, economic status, etc., and the second part related to knowledge about abortion. Data were collected by the researcher are from nurses who work at Bint Al-Huda hospital in Thi-Qar governorate through interview and by filling a questionnaire format. Reliability of the resolution The internal adhesion was determined during the Cornbach’s alpha (0.85) and by the expert arbitrators of the questionnaire. Demographic information data were obtained during an interview with each nurse. The data collection process had been performed from February 13th through March 14th 2016.

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:

**RESULTS AND DISCUSSION**

Table (1) describes that more than half of the participants age is within 19-25 years-old (n=61; 61%); less than half of them has 2-5 years of working in nursing (n=43; 43%); whereas more than half of them report that their level of education is preparatory (n=67; 67%); the majority of them live in urban areas (n= 99; 99%); and more than half of the participants’ monthly income is sufficient (n=54; 54%).

Table2 shows, in the light of cutoff point (0.66) that the study subjects’ responses to the definition of abortion domain were high for all its items with average of score (2.84).

The finding of this table displays, in the light of cutoff point (0.66) that the study subjects’ responses to the symptom of abortion domain were high for all its items with average of score (2.72). in the light of cutoff point (0.66) that the study subjects’ responses to the causes of abortion domain were high for all its items with average of score (2.7). The table displays, in the light of cutoff point (0.66) that the study subjects’ responses to the complication of abortion domain were high for all its items with average of score (2.68). The finding of this table displays, in the light of cutoff point (0.66) that the study subjects’ responses to the practice to prevent abortion domain were high for all its items with average of score (2.86). The participants’ mean age is 25, more than half of them are within 19-25 years-old. This result is consistent with the study of Tziaferi, et.al, who have found that most workers in nursing, with a mean age of 25 years old, in the general hospital. This can be attributed that most nurses who are participants in this study are newly employed; they are small in age. The mean of years of working in nursing is 4, less than half of them have 2-5 years of working in nursing. This result is consistent with the study of Velonakis MG and Tsalikoglou, who have found that, the greatest sample have less than 5 years of clinical experience (51%).

This can be attributed that most nurses are newly employed, and have less than five years of working in nursing. The vast majority of them have Preparatory Nursing School in level of Education. This result is consistent with the study of Marziale and Hong, who have found that In relation to the level of educational attainment, most nurses have high school education prevailing (54.3%) which is the minimum requirement to carry out the job. This can be attributed that the number of nursing institutes and colleges has been very limited in the last years, in comparison to the huge number of preparatory nursing schools. The vast majority of them live in urban areas. This can be attributed that most hospitals lie in the city center where they are more close to nurses. Moreover, most of rural people prefer to work in their farms rather than looking for other jobs. More than half of them report that their monthly income is sufficient. This can be attributed that, as mentioned earlier, most of those nurses are newly employed and
need less than old workers responsibilities. The vast majority of participants have high level of knowledge toward abortion. This result is consistent with the study of Shimelash Bitew et al. who have found that, generally from this study, we can conclude that above half had knowledge about abortion and its complication. This can be attributed that most of the participants are newly employee which have fresh information from the school and high incidence of abortion cases in this hospital help to enhance the knowledge toward the abortion.

Table 1. Distribution of the nurses’ knowledge by their demographic characteristics (n=100)

<table>
<thead>
<tr>
<th>Demographic data (n=100)</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-18</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>19-25</td>
<td>61</td>
<td>61.0</td>
</tr>
<tr>
<td>26-32</td>
<td>20</td>
<td>20.0</td>
</tr>
<tr>
<td>33-39</td>
<td>12</td>
<td>12.0</td>
</tr>
<tr>
<td>40-46</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
<tr>
<td>Years of experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2</td>
<td>36</td>
<td>36.0</td>
</tr>
<tr>
<td>2-5</td>
<td>43</td>
<td>43.0</td>
</tr>
<tr>
<td>6-9</td>
<td>11</td>
<td>11.0</td>
</tr>
<tr>
<td>10-13</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>14-17</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>&gt;18</td>
<td>4</td>
<td>4.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
<tr>
<td>Level of educations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>7</td>
<td>7.0</td>
</tr>
<tr>
<td>Intermediate</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Preparatory</td>
<td>67</td>
<td>67.0</td>
</tr>
<tr>
<td>Institute&amp; college</td>
<td>25</td>
<td>25.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
<tr>
<td>Living</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>99</td>
<td>99.0</td>
</tr>
<tr>
<td>Rural</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
<tr>
<td>Monthly income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sufficient</td>
<td>54</td>
<td>54.0</td>
</tr>
<tr>
<td>Somewhat Sufficient</td>
<td>31</td>
<td>31.0</td>
</tr>
<tr>
<td>Insufficient</td>
<td>15</td>
<td>15.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 2. Description of Nurses’ Knowledge toward Definition of Abortion

<table>
<thead>
<tr>
<th>Definition of Abortion</th>
<th>I know</th>
<th>Unsure</th>
<th>I don’t know</th>
<th>Total</th>
<th>Mean</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F %</td>
<td>F %</td>
<td>F %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I don’t know</td>
<td>4</td>
<td>4</td>
<td>11</td>
<td>100</td>
<td>2.86</td>
<td>H</td>
</tr>
<tr>
<td>I know</td>
<td>90</td>
<td>6</td>
<td>4</td>
<td>100</td>
<td>2.81</td>
<td>H</td>
</tr>
</tbody>
</table>

Pregnancy loss during the first 23 weeks

One of the problems of pregnancy

Vaginal bleeding affects the pregnant woman

Total 2.84 H

Table 3. Description of Nurses’ Knowledge toward Symptom of Abortion

<table>
<thead>
<tr>
<th>Symptom of Abortion</th>
<th>I know</th>
<th>Unsure</th>
<th>I don’t know</th>
<th>Total</th>
<th>Mean</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F %</td>
<td>F %</td>
<td>F %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal bleeding</td>
<td>93</td>
<td>6</td>
<td>1</td>
<td>100</td>
<td>2.92</td>
<td>H</td>
</tr>
<tr>
<td>Spasm and pain in the lower abdomen</td>
<td>97</td>
<td>3</td>
<td>-</td>
<td>100</td>
<td>2.97</td>
<td>H</td>
</tr>
<tr>
<td>Vaginal secretions of the vagina</td>
<td>76</td>
<td>15</td>
<td>9</td>
<td>100</td>
<td>2.67</td>
<td>H</td>
</tr>
<tr>
<td>Secretions of vaginal tissue</td>
<td>55</td>
<td>28</td>
<td>17</td>
<td>100</td>
<td>2.38</td>
<td>H</td>
</tr>
<tr>
<td>She did not suffer from pregnancy symptoms</td>
<td>63</td>
<td>26</td>
<td>11</td>
<td>100</td>
<td>2.52</td>
<td>H</td>
</tr>
<tr>
<td>lower back pain</td>
<td>91</td>
<td>9</td>
<td>-</td>
<td>100</td>
<td>2.91</td>
<td>H</td>
</tr>
</tbody>
</table>

Total 2.72 H

Table 4. Description of Nurses’ Knowledge toward Cause of Abortion

<table>
<thead>
<tr>
<th>Cause of Abortion</th>
<th>I know</th>
<th>Unsure</th>
<th>I don’t know</th>
<th>Total</th>
<th>Mean</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F %</td>
<td>F %</td>
<td>F %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>74</td>
<td>15</td>
<td>11</td>
<td>100</td>
<td>2.63</td>
<td>H</td>
</tr>
<tr>
<td>Severe hypertension</td>
<td>84</td>
<td>10</td>
<td>6</td>
<td>100</td>
<td>2.78</td>
<td>H</td>
</tr>
<tr>
<td>Hyperthyroidism</td>
<td>61</td>
<td>26</td>
<td>13</td>
<td>100</td>
<td>2.48</td>
<td>H</td>
</tr>
<tr>
<td>College diseases</td>
<td>61</td>
<td>24</td>
<td>15</td>
<td>100</td>
<td>2.46</td>
<td>H</td>
</tr>
<tr>
<td>Rubella</td>
<td>72</td>
<td>22</td>
<td>6</td>
<td>100</td>
<td>2.66</td>
<td>H</td>
</tr>
</tbody>
</table>
Table 4. Description of Nurses’ Knowledge toward Cause of Abortion

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>I know</th>
<th>Unsure</th>
<th>I don’t know</th>
<th>Total</th>
<th>Mean</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F %</td>
<td>F %</td>
<td>F %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Continuous bleeding</td>
<td>90 90</td>
<td>4 4</td>
<td>6 6</td>
<td>100</td>
<td>2.84</td>
<td>H</td>
</tr>
<tr>
<td>2</td>
<td>Delay pregnancy</td>
<td>80 80</td>
<td>14 14</td>
<td>6 6</td>
<td>100</td>
<td>2.74</td>
<td>H</td>
</tr>
<tr>
<td>3</td>
<td>Infection and inflammation occur</td>
<td>86 86</td>
<td>10 10</td>
<td>4 4</td>
<td>100</td>
<td>2.82</td>
<td>H</td>
</tr>
<tr>
<td>4</td>
<td>Depression</td>
<td>87 87</td>
<td>10 10</td>
<td>3 3</td>
<td>100</td>
<td>2.84</td>
<td>H</td>
</tr>
<tr>
<td>5</td>
<td>Repeated abortion</td>
<td>90 90</td>
<td>7 7</td>
<td>3 3</td>
<td>100</td>
<td>2.87</td>
<td>H</td>
</tr>
<tr>
<td>6</td>
<td>Infertility</td>
<td>68 68</td>
<td>15 15</td>
<td>17 17</td>
<td>100</td>
<td>2.51</td>
<td>H</td>
</tr>
<tr>
<td>7</td>
<td>Ectopic pregnancy</td>
<td>71 71</td>
<td>12 12</td>
<td>17 17</td>
<td>100</td>
<td>2.54</td>
<td>H</td>
</tr>
<tr>
<td>8</td>
<td>Feeling of constant anxiety and stress</td>
<td>81 81</td>
<td>10 10</td>
<td>9 9</td>
<td>100</td>
<td>2.72</td>
<td>H</td>
</tr>
<tr>
<td>9</td>
<td>Anorexia</td>
<td>65 65</td>
<td>19 19</td>
<td>16 16</td>
<td>100</td>
<td>2.49</td>
<td>H</td>
</tr>
<tr>
<td>10</td>
<td>Difficulty sleeping</td>
<td>62 62</td>
<td>21 21</td>
<td>17 17</td>
<td>100</td>
<td>2.45</td>
<td>H</td>
</tr>
<tr>
<td>11</td>
<td>Total</td>
<td>2.7</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Description of Nurses’ Knowledge toward Complication of Abortion

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>I know</th>
<th>Unsure</th>
<th>I don’t know</th>
<th>Total</th>
<th>Mean</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Complication of Abortion</td>
<td>F %</td>
<td>F %</td>
<td>F %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Continuous bleeding</td>
<td>90 90</td>
<td>4 4</td>
<td>6 6</td>
<td>100</td>
<td>2.84</td>
<td>H</td>
</tr>
<tr>
<td>2</td>
<td>Delay pregnancy</td>
<td>80 80</td>
<td>14 14</td>
<td>6 6</td>
<td>100</td>
<td>2.74</td>
<td>H</td>
</tr>
<tr>
<td>3</td>
<td>Infection and inflammation occur</td>
<td>86 86</td>
<td>10 10</td>
<td>4 4</td>
<td>100</td>
<td>2.82</td>
<td>H</td>
</tr>
<tr>
<td>4</td>
<td>Depression</td>
<td>87 87</td>
<td>10 10</td>
<td>3 3</td>
<td>100</td>
<td>2.84</td>
<td>H</td>
</tr>
<tr>
<td>5</td>
<td>Repeated abortion</td>
<td>90 90</td>
<td>7 7</td>
<td>3 3</td>
<td>100</td>
<td>2.87</td>
<td>H</td>
</tr>
<tr>
<td>6</td>
<td>Infertility</td>
<td>68 68</td>
<td>15 15</td>
<td>17 17</td>
<td>100</td>
<td>2.51</td>
<td>H</td>
</tr>
<tr>
<td>7</td>
<td>Ectopic pregnancy</td>
<td>71 71</td>
<td>12 12</td>
<td>17 17</td>
<td>100</td>
<td>2.54</td>
<td>H</td>
</tr>
<tr>
<td>8</td>
<td>Feeling of constant anxiety and stress</td>
<td>81 81</td>
<td>10 10</td>
<td>9 9</td>
<td>100</td>
<td>2.72</td>
<td>H</td>
</tr>
<tr>
<td>9</td>
<td>Anorexia</td>
<td>65 65</td>
<td>19 19</td>
<td>16 16</td>
<td>100</td>
<td>2.49</td>
<td>H</td>
</tr>
<tr>
<td>10</td>
<td>Difficulty sleeping</td>
<td>62 62</td>
<td>21 21</td>
<td>17 17</td>
<td>100</td>
<td>2.45</td>
<td>H</td>
</tr>
<tr>
<td>11</td>
<td>Total</td>
<td>2.68</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6. Description of Nurses’ Knowledge toward Practice to prevent Abortion

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>I know</th>
<th>Unsure</th>
<th>I don’t know</th>
<th>Total</th>
<th>Mean</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Non-smoking</td>
<td>93</td>
<td>93</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Do not drink alcohol</td>
<td>96</td>
<td>96</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Eat balanced healthy food</td>
<td>98</td>
<td>98</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Take the necessary vaccinations</td>
<td>97</td>
<td>97</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Maintain healthy weight before pregnancy</td>
<td>96</td>
<td>96</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Exercise during pregnancy</td>
<td>72</td>
<td>72</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>Narrowing the cervix</td>
<td>83</td>
<td>83</td>
<td>10</td>
<td>10</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.86</td>
</tr>
</tbody>
</table>

CONCLUSION

The study results indicated that more than half of the participants’ age is within 19-25 years-old (61%); less than half of them has 2-5 years of working in nursing (43%); whereas more than half of them report that their level of education is preparatory (67%); the majority of them live in urban areas (99%); and more than half of the participants’ monthly income is sufficient (54%), and the study subjects’ responses to the overall knowledge were high with score (89%). Initiating training program; especially; for newly working nurses that aim to increase their knowledge and increase awareness and education for Nurses workers in hospitals through posters, seminars, and media.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Thi-Qar, Faculty of nursing, Department of pediatric nursing - Nasiriyah and all experiments were carried out in accordance with approved guidelines.

REFERENCES

4. WHO. Safe motherhood programs: Option and issues. Deborah maine, program Director, prevention of maternal mortality, center for population & family health; second printing, 1993:12.
11. Marziale MH, Hong OS. Occupational health

Evaluation of Nurses’ Knowledge toward Breast Self-Examination at Al- Hussien Teaching Hospital in Thi-Qar Governorate

Alaa M. Tuama¹, Wasan Raheem Mubarak², Ahmed Abudallh Abud³

¹University of Thi_Qar, Faculty of Nursing, Department of Community nursing - Nasiriyah – IRAQ, ²University of Thi_Qar, Faculty of Medicine, Department of Gynecology, Nasiriyah – IRAQ, ³University of Thi_Qar, Faculty of Nursing, Department of Pediatric Nursing - Nasiriyah – IRAQ

ABSTRACT

Objective: To evaluate nurses’ knowledge toward Breast Self-Examination at Al- Hussien Teaching Hospital in Thi-Qar governorate. A purposive “non-probability” sample of (238) nurses who were selected from Al-Hussien Teaching hospital in Thi-Qar governorate for the period from October 1st 2015 to April 1st of 2016. The study results indicated that the participants’ age is more than half of them is within 18-27 years-old (62.2%), their gender is approximate; (69.3%) for female, and (30.7%) for male, more than half of them are married (n=131; 55%); more than half of them has ≤ 5 years of working in nursing (62.6%), more than half of them report that their monthly income is Enough somewhat (51.7%); the majority of them live in urban areas (90.8%); and less than quarter of them work in emergency room (23.9%); less than half of them has Academic achievement is Institute (41.2%). The majority of the participant has a high knowledge (87%). there was a significant association between the nurses’ knowledge and their monthly income, address, and workplace.

Keywords: Nurses; Knowledge ; Examination of Breast Self.

INTRODUCTION

Breast cancer is an abnormal increase in the size of breast cells. The incidence of this disease in developed countries and globally is one of the leading cause of death in the world. Breast cancer spreads at certain periods and according to studies in pregnant women and rates ranging from 1-3 per case of 10,000 pregnancies. Recent estimates suggest that the rate of cancer will be tripled in 2030 at 20-26 million new cases of cancer and three times by 2030, with new cancer cases ranging from 20 to 26 million deaths and 17-17 million cases. People are more likely to die of cancer, more than 70% of breast cancer deaths are common in developed countries, technology and developing countries. Breast self examination (BSE) In the health institutions mothers are taught how to self-examination of the breast, a method by the woman to examine her nipple through her vision and feel with her fingers and the detection of her breasts, The purpose of periodic breast examination is to raise the level of knowledge of people who are expected to have the disease and know the characteristics and changes that occur in the form and size of the glands in the breast and the detection of tumors present. BSE technique involves touching the breast to lump with tips fingers, rather than flat by hand. Women will be in erectile position, Women are able to detect about 95% of changes in the breast early to reduce breast cancer incidence. The ages in which women’s deaths range from 40 to 50 years. Global statistics indicate an increase in the rate of breast cancer in developing countries. Many studies have focused on the more common breast cancer that is a threat to the world. Early detection of breast changes has a role in reducing mortality. Despite the above mentioned
reasons, women do not use regular breast screening to
detect the disease, especially in developing countries\(^\text{12}\)

**METHODOLOGY**

A descriptive study was conducted at Thi-Qar Governorate in Al-
Hussein Teaching Hospital, from the period of the October 1\(^{st}\) 2015 to April 1\(^{st}\) of 2016. A purposive sample is “Non-probability” of 238 male
and female nurses participants out of 715 who work in
the units from which the study sample was recruited, in
the above mentioned hospitals were selected according
specific criteria.

**Data Collection:**

The questionnaire was used in the design of the
research. Previous studies were done in two parts. The
first part was related to demographic information, for
example, age, educational level, etc. The other part was
related to knowledge of breast examination. Data were
collected by the researcher are from nurses who work at
Al-Hussein Teaching Hospital in Thi-Qar governorate
through interview and by filling a questionnaire
format. The reliability of the resolution through internal
isotope was (0.70) and through the use of experts. The
direct interview of the nurse has an important role in
collecting the sample and identifying the obstacles
The data collection process had been performed from (4)\(^{th}\)
November 2015 until (25)\(^{th}\) January 2016. 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- Chi-Square: for testing a difference between several category nominal scales of
dichotomous random variables.

\[
\chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}
\]

\(\chi^2\) = Pearson's cumulative test statistic, which asymptotically approaches
a \(\chi^2\) distribution.

\(O_i\) = an observed frequency;

\(E_i\) = an expected (theoretical) frequency, asserted by the null hypothesis;

\(n\) = the number of cells in the table.

2- The P. value indicates that the degree of significance was (P \(\leq 0.05\)) to just
significant result

3- Cut-off-point: 1-1.33 = High; 1.34-1.67= Moderate; 1.68-2.00 = Low; H = High;
M= Moderate; L = Low.

4- Statistical table (Frequencies & Percentages).

\[
\% = \frac{\sum f}{n} \times 100
\]
RESULTS AND DISCUSSION

Table (1) describes that the participants’ age is more than half of them is within 18-27 years-old (n=148; 62.2%), their gender is approximate; (n=165; 69.3%) for female, and (n=73; 30.7%) for male, more than half of them are married (n=131; 55%); more than half of them has ≤ 5 years of working in nursing (n=149; 62.6%), more than half of them report that their monthly income is enough somewhat (n=123; 51.7%); the majority of them live in urban areas (n=216; 90.8%); and less than quarter of them work in emergency room (n=57; 23.9%); less than half of them has Academic achievement is Institute (n= 98; 41.2%). The table reveals that the majority of participant has a high knowledge (n=207; 87%), in contrast to the less than third of participants who have a moderate knowledge (n=30; 12.6%). There was significant association between the nurses’ knowledge and their monthly income, address and workplace at (P<0.05); in contrast, there was non-significant association between the nurses’ knowledge and residue demographic characteristics when analyzed by chi-square test. The participants’ age ranged from 18-27 years-old. This result is consistent with the study of Ebirim Chikere, et.al, who have found that most workers in nursing, with a mean age of 21.9 ± 2.7 years old. This can be attributed that most nurses who are participants in this study are newly employed; they are small in age. More than half gender of the sample was female. This result is consistent with the study of Dalal M. Nemenqani, et.al, who have found that most the study nurses were female. This can be attributed that most nurses who are participants in this study are newly employed; they are small in age. More than half gender of the sample was female. This result is consistent with the study of Israa M. Alkhasawneh, who have found that most female Registered Nurses 62% were married. This can be attributed that most nurses who are participants in this study are newly employed; they are small in age. More than half gender of the sample was female. This result is consistent with the study of Israa M. Alkhasawneh, who have found that most female Registered Nurses 62% were married. More than half of them have ≤ 5 years of working in nursing This result is consistent with the study of Israa M. Alkhasawneh, who have found that, the greatest sample have less than 5 years of clinical experience (64%). This can be attributed that most nurses are newly employed, and have less than five years of working in nursing. More than half of them report that their monthly income was enough somewhat. This result is consistent with the study of Ahmad Ayed. et. al., who have found that, More than half of the sample (54.6%) were enough somewhat monthly income. This can be attributed that, as mentioned earlier, most of those nurses are newly employed and need less than old workers responsibilities. The vast majority of them live in urban areas. This can be attributed that most hospitals lie in the city center where they are more close to nurses. Moreover, most of rural people prefer to work in their farms rather than looking for other jobs. More than half of them report that their workplace was emergency. This can be attributed that the greatest proportion of study sample is drawn from emergency department, because the number of nurses who work in this department is much more the number of nurses who work in other units of the hospitals. The vast majority of them have Preparatory Nursing School in level of Education. This result is consistent with the study of Seideh Fatemeh Hosssi, et. al, who have found that In relation to the level of educational attainment, most nurses have high school education prevailing (41.7%) which is the minimum requirement to carry out the job. This can be attributed that the number of nursing institutes increased according to start opening new institute school. The vast majority of participants have high level of knowledge toward breast self examination. This result is consistent with the study of Linda Akuamoa Sarfo et. al. who have found that, majority of the female nursing students had knowledge about breast self examination. This can be attributed that most of the participants are newly employee which have fresh information from the school and high awareness help to enhance the knowledge toward the breast self examination. Regarding to association between nurses’ knowledge toward BSE and their demographical characteristic the table show that, there was a significant association between nurses knowledge toward BSE and high awareness help to enhance the knowledge toward breast self examination. This cor relation between the level of awareness and the monthly income is better. All the nurses who have a skill about the nursing profession had a better monthly income, and this gives us the higher the level of knowledge about the nursing tasks there was an increase in monthly income. There was a significant association between nurses knowledge toward BSE and their residence. This result is consistent with the study of Ahmad Ayed. et. al., who have found that statistical significant relation between total mean knowledge of BSE and residence area. The correlation was significant between nurses’ self-examination and their workplace. This study is consistent with the y vonne ten hoeve .et.al., fact that there is a statistically significant relationship between self-examination and the work place of nurses, as factors influencing the knowledge of nurses. Experience has a significant role in raising the level of knowledge and interaction On the professional side with high-class co-workers.
CONCLUSION

The study results indicated that the participants’ age is more than half of them is within 18-27 years-old (62.2%), their gender is approximate; (69.3%) for female, and (30.7%) for male, more than half of them are married (n=131; 55%); more than half of them has ≤ 5 years of working in nursing (62.6%), more than half of them report that their monthly income is Enough somewhat (51.7%); the majority of them live in urban areas (90.8%); and less than quarter of them work in emergency room (23.9%); less than half of them has Academic achievement is Institute (41.2%). The majority of the participant has a high knowledge (87%). there was a significant association between the nurses’ knowledge and their monthly income, address, and workplace.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Thi_Qar, Faculty of nursing, Department of community nursing – Nasiriyah, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

Knowledge of Patients with Coronary Heart Disease about Secondary Prevention Measures

Hassan Abdullah Athbi¹, Huda Baker Hassan²

¹Instructor/MSc. Adult Nursing Department/College of Nursing/ University of Kerbala, Iraq,
²Professor/PhD. Adult Nursing Department/College of Nursing/ University of Baghdad, Iraq

ABSTRACT

A descriptive study design carried out in the outpatient clinic at Kerbala Center for Cardiac Disease and Surgery, from the period of November 2017 to December 2018. A non-probability sampling method consists of 64 patients was selected purposively based on the study criteria. Two parts of the questionnaire was used in this study; part one, designed to assess the socio-demographic data; and the second part, was used to investigate the level of knowledge regarding secondary prevention of CHD. A p-value of <0.05 was considered statistically significant. Out of 64 patients, 56.3% were men, and 43.7% were women, with an overall mean age of 56.2±0.89 years. In addition to that, 98.4%, and 37.5% of patients were married and housewives respectively. The total mean scores of knowledge regarding the CHD epidemiology was 1.7±0.31, knowledge about risk factors of CHD 1.6±0.24, knowledge regarding dietary recommendations of CHD 1.6±0.31, CHD medical knowledge 1.5±0.24, knowledge regarding symptoms of CHD 1.8±0.41, and the overall knowledge respondents 1.6±0.15. Pearson correlation test showed a highly significant correlation between the patients’ knowledge and their educational level and occupation at p-value of (0.000), and family history of CHD at p-value of (0.04).

KEYWORDS: Knowledge, Coronary Heart Disease, Secondary Prevention Measures.

INTRODUCTION

Coronary heart disease (CHD) is the number one cause of death worldwide; more people die every year from CHD than from another cause (World Health Organization (WHO), 2017). Patients with CHD are at increased risk for developing recurrent heart attack and mortality. Several studies show that the risks of sudden deaths are increase 4-6 times among persons who have already suffered from CHD. The controlling of CHD risk factors will reducing recurrent hospitals admissions; and improving patients quality of life, significantly contributing to the survival and heart attacks prevention. Numerous guidelines in the clinical filed recommended modifications of lifestyle factors for the prevention and management of CHD that’s includes smoking cessation, controlling blood pressure (BP), lipid management, physical activity, weight management, management of type II diabetes mellitus (DM), and complying with prescribed medication. It is important when viewing the prevalence of CHD to be focusing on the preventive part rather than curative part only. Hence, “prevention is better than cure”. Disease prevention should be emphasized on identify the disease process, recognizing disease risk factors and founding management that ultimately decreases the risk. Secondary prevention of CHD indicates all efforts that used to reduce recurrent heart attacks and decrease mortality, it is indicated for patients diagnosed with CHD and those at high risk for developing recurrent heart attacks. WHO, mentioned that the secondary prevention deals with control of risk factors and appropriate pharmacological therapy in patients with chronic CHD or after an acute coronary event. Knowledge and understanding of CHD and its risk factors affect the judgment and decisions of prevention and control of CHD, and may result in developing preventive behaviors.
METHODOLOGY

Design and setting of the study: A descriptive study design carried out in the outpatient clinic at Kerbala Center for Cardiac Disease and Surgery in Holy Kerbala, from the period of November 2017 to December 2018, in order to evaluate the patient’s knowledge about secondary preventive measures of CHD.

Sample of the study: A non-probability sampling method consists of 64 patients was selected purposively based on the study criteria and after obtains verbal consent permission from them.

The study instrument: Two parts of the questionnaire was used in this study, part one, designed to assess the socio-demographic data and the second part was used to investigate the knowledge regarding secondary prevention of CHD. A translated version of Arabic language of a comprehensive heart disease knowledge questionnaire was formerly constructed and validated by Bergman et al., (2011) at the National Institutes of Health in Canada, this questionnaire was proposed to evaluate knowledge regarding heart disease through 30-items related to five aspects of heart disease knowledge that involve 7 item related to medical knowledge; 4 item relevant to knowledge about heart disease epidemiology; 4 item concerning to knowledge about symptoms of heart attack; 9 item related to knowledge about risk factors of heart disease; and 6 item related to dietary recommendations knowledge, all of these items were responded by agree, don’t know, and disagree.

Statistical analysis: The data were analyzes by using the program of IBM Statistical Package of Social Sciences (SPSS) Version 23. Both descriptive statistical analysis (include frequencies (F), percentages (%), cumulative percent, MS, and standard deviation (SD)) and inferential statistical analysis approaches were used in order to analyze and assess the results of the study, a Person correlation test was used to associate selected demographic variables of patients with level of knowledge respondents. A p-value of <0.05 was considered statistically significant.

RESULTS AND DISCUSSION

Table 1 shows that are 48% of patients were more than 50 years, the mean score of the participants age were 56.2. More than one half of the study sample are male (56.3%) and the remaining are female (43.7%), regarding the level of education the greater number of them have had a primary school education and accounted for (40.6%), and (37.5%) of them housewives. Table 2 shows that there are approximately more than one half of the patients involved in this study was identified as a known case of DM and / or hypertension, and 68.8%, 51.6 of them have had MI and >1 year duration of disease respectively. Table 3 shows that 63 subject out of 64 which accounted for (98.4%) of the study sample are within the category of < cut off point of the total knowledge domains of the study. Table 4 exposed a highly significant association between the patients’ knowledge with their educational level and occupation at p-value of (0.000), and there is a no significant association between the patients’ knowledge and their gender or age groups. Table 5 exposed a significant association was found between the patients’ knowledge and family history of CHD at p-value of (0.04), in contrast there is no significant association between the patients’ knowledge and the other medical information such as types, duration of CHD, known case of DM and hypertension. A total of (64) patient was involved in this study in order to evaluate their knowledge about secondary prevention of CHD. Table (1) represent the socio-demographic characteristics of participants, it is exposed that are the majority (75%) of patients were within the age groups of 50 years and more, and approximately 19% of patients between the age of 40-49 years, the mean age of patients was 56.2±0.89 years. More than one half (56.3%) of the study sample were male and the remaining (43.7%) were female, and about 98.4% of them were married. This result corresponds with the finding of the study which was done by John and Haseena (2015) that are reported about 17 % of CHD patients were belonged to 60-69 years and only 8% of patients belonged to 70-79 years old, more than half (58.5%) of the patients were men and 41.5% patients were women, also about 95% of patients were married. Amarasekara, et al., (2016) (5) in a study to assess knowledge, attitudes, and practices on lifestyle and cardiovascular risk factors among metabolic syndrome patients in an urban tertiary care institute in Sri Lanka, reported that are 87% of patients involved in this study were females, and 60.7% were housewives. In terms of participants occupation the result in table (1) signify that are about 15.6%, 17.2%, 17.2%, and 37.3% of them were gainer, governmental employed, retired/ does not working, and housewives respectively. This result resembles the findings of the study that was done
at Al-Najaf city by Abd-Ali and AL-Rubaiyee (2015), mentioned that are the highest percentage of CHD patients were housewives followed by the employed patients. Another study which was done by Angosta and Speck, (2014) to evaluate the knowledge of heart disease among first-generation Filipino Americans and the risk factors prevalent among them, revealed that are 71% of patients involved in this study were employed, and 29% of them were unemployed. Concerning to the patient’s knowledge about secondary prevention of CHD as shown in table (3) the findings highlight that the participants had low level of knowledge in most domains regarding the secondary prevention of CHD. The overall total level of knowledge was inadequate; the mean of score was 1.6±0.15. This finding was corresponding with the result of the study that was done by Choudhary, et al., (2014) revealed that are a significant percentage (84.67%) of patients has limited knowledge regarding preventive measures of CHD, Khan, et al., (2013) revealed that the knowledge of patients with CHD about their disease and its prevention was insufficient. Another study that was done by Pinheiro, et al., (2014) shows a significant deficits in patient knowledge, and this deficits in knowledge were clearly identified in the areas of pathophysiology of the disease, recommended physical activity and treatment of patients with CHD. Another study that was done by Amarasekara, et al., (2016) to assess knowledge, attitudes, and practice of heart disease and its risks revealed that patients have a moderate knowledge regarding heart disease risk factors modifications. Concerning the association between patient’s knowledge and their socio-demographic characteristics as shown in table (4) the result exposed that there is a highly significant association between the patients’ knowledge and their educational level and occupation at p-value of 0.000, and there is no significant association between the patients’ knowledge and their age groups and gender. This result was similar with the findings of the study which was done by Al-Tamimi, et al., (2017) to evaluate knowledge of preventive measures among Omani CHD patients indicated that are no socio-demographic variables was found to predict inadequate knowledge levels between this patients. The association of between patient’s knowledge and their medical information as shown in table (5) indicates that there is a significant association was found between the level of knowledge and family history of CHD, this may be because of the persons with a n family history of CHD may have a motivation to identify additional information about this situation. In contrast to that, there is no significant association was found between the patients’ knowledge and the other medical information such as types, duration of CHD, known case of DM and hypertension. This result was disagrees with the findings of the study of Andsoy, et al., (2015) revealed that the females who have a history of DM perceived themselves at high risk for developing CHD and therefore trying to identifying more knowledge about CHD.

Table (1): Distribution of CHD patients by their socio-demographic characteristics (n=64).

<table>
<thead>
<tr>
<th>Socio-Demographic Characteristics</th>
<th>Frequency (F)</th>
<th>Percentage (%)</th>
<th>Cumulative Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age Groups</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>2</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>30-39</td>
<td>2</td>
<td>3.1</td>
<td>6.2</td>
</tr>
<tr>
<td>40-49</td>
<td>12</td>
<td>18.8</td>
<td>25</td>
</tr>
<tr>
<td>50-59</td>
<td>23</td>
<td>35.9</td>
<td>60.9</td>
</tr>
<tr>
<td>≥ 60</td>
<td>25</td>
<td>39.1</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>MS= 56.2, SD=0.89</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>28</td>
<td>43.7</td>
<td>43.7</td>
</tr>
<tr>
<td>Male</td>
<td>36</td>
<td>56.3</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>1</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Married</td>
<td>63</td>
<td>98.4</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Cont.. Table (1): Distribution of CHD patients by their socio-demographic characteristics (n=64).

<table>
<thead>
<tr>
<th>Education levels</th>
<th>Frequency (F)</th>
<th>Percentage (%)</th>
<th>Cumulative Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>9</td>
<td>14.1</td>
<td>14.1</td>
</tr>
<tr>
<td>No formal education/Read &amp; Write</td>
<td>8</td>
<td>12.5</td>
<td>26.6</td>
</tr>
<tr>
<td>Primary school</td>
<td>26</td>
<td>40.6</td>
<td>67.2</td>
</tr>
<tr>
<td>Intermediate school</td>
<td>7</td>
<td>10.9</td>
<td>78.1</td>
</tr>
<tr>
<td>Secondary school</td>
<td>9</td>
<td>14.1</td>
<td>92.2</td>
</tr>
<tr>
<td>Institute Graduated</td>
<td>4</td>
<td>6.3</td>
<td>98.4</td>
</tr>
<tr>
<td>College Graduated</td>
<td>1</td>
<td>1.6</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Frequency (F)</th>
<th>Percentage (%)</th>
<th>Cumulative Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>1</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Governmental employed</td>
<td>11</td>
<td>17.2</td>
<td>18.8</td>
</tr>
<tr>
<td>Retired/ Does not working</td>
<td>11</td>
<td>17.2</td>
<td>35.9</td>
</tr>
<tr>
<td>Retired/Working</td>
<td>7</td>
<td>10.9</td>
<td>46.9</td>
</tr>
<tr>
<td>Housewife</td>
<td>24</td>
<td>37.5</td>
<td>84.4</td>
</tr>
<tr>
<td>Gainer</td>
<td>10</td>
<td>15.6</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (2): Distribution of CHD patients by their medical information (n=64).

<table>
<thead>
<tr>
<th>Medical information</th>
<th>Frequency (F)</th>
<th>Percentage (%)</th>
<th>Cumulative Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of CHD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angina Pectoris</td>
<td>20</td>
<td>31.2</td>
<td>31.2</td>
</tr>
<tr>
<td>MI</td>
<td>44</td>
<td>68.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Duration of CHD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 6 months</td>
<td>18</td>
<td>28.1</td>
<td>28.1</td>
</tr>
<tr>
<td>≥ 6 -1 year</td>
<td>13</td>
<td>20.3</td>
<td>48.4</td>
</tr>
<tr>
<td>&gt;1 year</td>
<td>33</td>
<td>51.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Family history of CHD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>34</td>
<td>53.1</td>
<td>53.1</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>46.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Known case of DM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33</td>
<td>51.6</td>
<td>51.6</td>
</tr>
<tr>
<td>No</td>
<td>31</td>
<td>48.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Known case of hypertension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>34</td>
<td>53.1</td>
<td>53.1</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>46.9</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (3): Statistical result for the distribution of the main knowledge domains (n=64).

<table>
<thead>
<tr>
<th>Domains</th>
<th>F</th>
<th>%</th>
<th>M.S</th>
<th>SD</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge about the epidemiology of CHD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; cut off point</td>
<td>46</td>
<td>71.9</td>
<td>1.7</td>
<td>0.31</td>
<td>L</td>
</tr>
<tr>
<td>≥ cut off point</td>
<td>18</td>
<td>28.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge about the risk factors of CHD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; cut off point</td>
<td>54</td>
<td>84.4</td>
<td>1.6</td>
<td>0.24</td>
<td>L</td>
</tr>
<tr>
<td>≥ cut off point</td>
<td>10</td>
<td>15.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cont.. Table (3): Statistical result for the distribution of the main knowledge domains (n=64).

<table>
<thead>
<tr>
<th>Knowledge related to dietary recommendation of CHD</th>
<th>&lt; cut off point</th>
<th>≥ cut off point</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>54</td>
<td>10</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>84.4</td>
<td>15.6</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>1.6</td>
<td>0.31</td>
<td>L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medical knowledge</th>
<th>&lt; cut off point</th>
<th>≥ cut off point</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>59</td>
<td>5</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>92.1</td>
<td>7.9</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>0.24</td>
<td>L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge related to symptoms of CHD</th>
<th>&lt; cut off point</th>
<th>≥ cut off point</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35</td>
<td>29</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>54.7</td>
<td>45.3</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>1.8</td>
<td>0.41</td>
<td>L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total domains Knowledge</th>
<th>&lt; cut off point</th>
<th>≥ cut off point</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>98.4</td>
<td>1.6</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>1.6</td>
<td>0.15</td>
<td>L</td>
</tr>
</tbody>
</table>

Table (4): Association between level of knowledge and socio-demographic factors of the study sample (n=64).

<table>
<thead>
<tr>
<th>No.</th>
<th>Socio-demographic factors</th>
<th>Overall knowledge respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Person Correlation</td>
<td>Sig. (2-tailed) P.Value</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) P.Value</td>
<td>Level of Significant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age groups</td>
<td>-0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Gender</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Educational level</td>
<td>0.6</td>
<td>0.000</td>
</tr>
<tr>
<td>Occupation</td>
<td>-0.4</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table (5): Association between level of knowledge and medical information of the study sample (n=64).

<table>
<thead>
<tr>
<th>No.</th>
<th>Socio-demographic factors</th>
<th>Overall knowledge respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Person Correlation</td>
<td>Sig. (2-tailed) P.Value</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) P.Value</td>
<td>Level of Significant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types of CHD</td>
<td>-0.08</td>
<td>0.4</td>
</tr>
<tr>
<td>Duration of CHD</td>
<td>0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Family history of CHD</td>
<td>0.25</td>
<td>0.04</td>
</tr>
<tr>
<td>Known case of DM</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Known case of hypertension</td>
<td>0.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

CONCLUSION

This study concludes that are inadequate level of knowledge regarding the secondary prevention of CHD was shown in overall domains that are related to secondary prevention, and there are highly significant correlation were found between the patients’ knowledge and their educational level, occupation, and a family history with CHD.

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 Kerbala, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


8. Al-Abbudi Sh, Lami F, Abed Wady Z. Prevalence and Assessment of Severity of Depression Among Ischemic Heart Disease Patients Attending Outpatient Cardiology Department Baghdad Teaching Hospital, Baghdad, Iraq. J Psychiatry. 2018; 21(2).


Post-Traumatic Stress Disorders among Cancer Patients in Kirkuk City

Abbas Lateef Muhe-Aldeen¹, Jenan Akbar Shakor², Darya Yaseen Mustafa³
¹Psych. Mental Health Nursing, Iraq, ²Community Health /Maternal Fetal Health, Iraq, ³Maternal & Child Health Nursing, Iraq

ABSTRACT

This study aimed to assess the degree of severity of the core symptoms of depression, anxiety and stress in cancer patients, and to signify Post-traumatic Stress Disorders among cancer patients. A descriptive study was carried out at Azadi teaching hospital in medical oncology ward in Kirkuk city, to achieve the objectives of the study a constructed questionnaire conducted for the purpose of the study, which consisted of three parts: the demographic characteristics; medical data and Anxiety, Depression and Stress Scale (DASS)it consists of 42-items was used to diagnose patients with PTSD. The data were collected through the use of the interview (face to face). They were analyzed through the application of descriptive statistical analysis (Frequency, Percentage%) and inferential statistical (T. Test and ANOVA) data analysis. The majority of the study sample were aged group (26%) was between (60-69) years, the male formed (48%), while the female (52%) in the whole study, (87%) of them were married,(33%) of the them were educational level illiterate, occupation female housewife (48%) & male free work (25%), (44%) of them had barely sufficient socio-economic status,(72%) of them from urban residency, and Since of diagnosed cancer(1- less than 3 years) formed (44%).

Keywords: PTSD, Depression, Anxiety, Stress, Cancer, Oncology Ward, DASS

INTRODUCTION

Post-traumatic stress disorder (PTSD), which has been commonly associated with in cancer patients. PTSD is a disturbance defined by the development of certain symptoms following an emotionally stressful event that involved actual death or the threat of death, serious injury, or a threat to oneself or others, cancer has qualities that are objectively traumatic. The criteria of PTSD cited in the DSM-IV-TR, symptoms must be present for at least 1 month, as might be the case following a cancer diagnosis. Cancer diagnosis, including prostate cancer, can be a major life stressor causing negative outcomes, such as depression, anxiety symptoms and post-traumatic stress disorder (PTSD)¹

The prevalence of psychological distress varies by type of cancer, time since diagnosis, degree of physical and role impairment, amount of pain, prognosis, and other variables. Studies have also documented the presence of symptoms meeting the criteria for post-traumatic stress disorder (PTSD) and post-traumatic stress symptoms (PTSS) in adults with cancer.² Depression is the most common mental disorder and symptoms include a lack of interest in daily activities and a lack of pleasure in activities that used to be pleasurable for the person, lack of energy, a change in sleeping pattern, a change in appetite, concentration problems, feelings of worthlessness and thoughts of death and suicide³. Symptoms of anxiety include constant worrying, constantly feeling tense, a fear of losing control, sleep problems, chest pain, heart palpitations and elevated blood-pressure. If the symptoms of anxiety are so intense that they disrupt daily life, a person may be diagnosed with an anxiety disorder.⁴ Many different crises can lead to post-traumatic growth of some kind, for example bereavement, HIV infection, heart attacks, cancer, coping with the medical problems of children, rheumatoid arthritis, combat, being taken hostage, sexual assault and sexual abuse.
The side effects of chemotherapy, radiation, hormone therapy, surgery, and other cancer treatments often lead to substantial permanent impairment of several organ systems, with resultant disability. Anxiety, mood disturbance, fear of recurrence, concerns about body image, and communication and other problems with family members are common in cancer patients as well. Patients may also experience more generalized worry; fear for the future; inability to make plans; changes in sexual function and reproductive ability, and changes in one’s role within the family and other relationships.

MATERIALS AND METHOD

Design of the Study: Descriptive study was carried out from June, 1st, 2014 to May, 5th, 2015 in order to achieve the objectives of the present study.

Setting of the Study: The study was conducted in Medical Oncology Ward at Azadi Teaching Hospital in Kirkuk City.

Sample of the study: Non-probability sampling approach (Purposive sample) consists of 100 patients were chosen as size of study sample that admitted to the Medical Oncology Ward at Azadi Teaching Hospital. Patients diagnosed with any type of cancer were included. The unstable patient and patients under 20 years were excluded from the study.

The instrument of the study: The questionnaire consisted of three parts:

Demographic data part: which consisted of (9) items that included: age, gender, marital status, level of education, occupation, place of job, financial status, residence, number of children)

Medical data part: Past medical illness, family history of cancer, smoking, Body mass index (height and weight of all patient were recorded), since of diagnosis of cancer, type of cancer, since of chemotherapy, number of session).

Depression Anxiety and Stress Scale (1995) was used to diagnose patients with (DASS) (This scale prepared to be applied by researcher through their interviewing of patients, it consists of 42-item, divided into three self-report scales designed to measure the negative emotional states of depression, anxiety and stress). Each of the three scales contain 14 items. The Depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, and lack of interest/involvement, anhedonia, and inertia. The Anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The Stress scale (items) is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and impatient. Respondents are asked to use 4 point severity/frequency scales to rate the extent to which they have experienced each state over the past week. The questionnaire was answered with four options as (0 if not apply), (1 if occasionally), (2 if often), (3 if always), the scales were measure the severity of the Depression, Anxiety and Stress based on the patients scores which given by researchers. Data collected by interview technique and took approximately (15 -20) minutes with each patient. Scores of Depression, Anxiety and Stress are calculated by summing the scores for the relevant items. The depression scale items are 3, 5, 10, 13, 16, 17, 21, 24, 26, 31, 34, 37, 38, 42. The anxiety scale items are 2, 4, 7, 9, 15, 19, 20, 23, 25, 28, 30, 36, 40, 41. The stress scale items are 1, 6, 8, 11, 12, 14, 18, 22, 27, 29, 32, 33, 35, 39. To use the Scoring Template (below) print on to a plastic overhead. The score for each of the respondents over each of the sub-scales, are then evaluated as per the severity-rating index.

Data analysis

The data are prepared, organized and entered into the computer file; Statistical Package for Social Science (SPSS) (21 version) is used for data analysis at (P. value ≤ 0.05). Data was which includes the descriptive data analysis (frequencies, percentages, mean of scores (M.S), inferential data analysis approach (ANOVA and T. Test)

RESULTS AND DISCUSSION

This table indicates that the majority of the study sample (26%) aged (60-69) years old. (52%) of the sample was female, (87%) of them were married. The majority (33%) of the sample was illiterate, regarding to the occupation (48%) of female was housewife while male (25%) are free work, in relation to financial status the majority of sample was barely sufficient socioeconomic status and constitute (44%), had of them (4-7) children, and (72%) of them from urban residency. Table 2 indicates that the majority of the study sample (45%) were no have past chronic medical disease, (65%) were...
No family history of cancer (63%) was No Smoking, 
In relation to since of diagnosis of cancer the (1- below 
3 years) formed (41%), (40%)of the sample were 
Normal-weight, (34%) were breast cancer and (22%) 
were prostate cancer. (71%) of the sample receiving 
chemotherapy (1-2) per month. Table 3 show that the 
majority of sample had severe stress& depression , while 
on anxiety scale had moderate. Table 4 show the majority 
of male had moderate& sever stress disorders which 
constituted (13%), while(15%) of female had severe 
anxiety disorder and the majority(18%) of female had 
server depression. Table 5 show the majority of sample 
had moderate stress disorders and occurred in age group 
(60-69), while the majority of sample had moderate 
depression disorders and occurred in agegroup (50-59) 
and the majority of sample had extremely sever anxiety 
disorder andocurred in age group (40-49). Table 6 
show that there were no significant differences between 
psychological distress and patients age at P. Value ≤ 0.05, 
but that there were highly significant differences between 
psychological distress and patients Financial Status at P. 
value ≤ 0.05. The study’s purpose was to examine post-
traumatic stress (depression, anxiety and stress) among 
cancer patients and impact of post-traumatic stress on 
depression and anxiety. For anxiety, the men who had 
higher levels of post-traumatic stress symptoms shortly 
after diagnosis were more likely to have higher levels 
of anxiety three months later, but only if they reported 
low levels of post-traumatic growth. However, a study 
has showed that even after one year since surgery as 
definite breast cancer treatment, patients did not present 
satisfactory recovery in functional and physical activity 
levels\(^{(10)}\), who found that post-traumatic growth did not 
moderate the effects of perceived severity of diagnosis 
on anxiety. The reason for this discrepancy could lie in 
the fact that the study of Bellury et. al. (2013) was 
cross-sectional or in the fact that they were examining 
the impact of perceived severity of cancer diagnosis on 
distress and not post-traumatic stress symptoms as in 
the present study, or it could be the difference in the 
study sample.\(^{(8)}\) The association between post-traumatic 
stress and depression was positive and fairly strong for 
low levels of post-traumatic growth but it did not reach 
significance, thus limiting the stress-buffering effect of 
post-traumatic growth. Others who have found that the 
interaction of post-traumatic stress and post-traumatic 
growth significantly predict depression, have found 
post-traumatic growth to have significant buffering 
effects, suggesting that our failure to find stress-
buffering effects of post-traumatic growth might be due 
to a lack of power as the number of participants. Post-
traumatic growth may act as a coping resource in itself, 
or it could be the outcome of successful coping with 
high levels of stress.\(^{(11)}\) Concerning cancer rehabilitation 
assistance, implementation of multidisciplinary teams to 
clinically monitor breast cancer patients optimizes the 
rehabilitation process, promotes reductions in mortality 
rates, and contributes to improve survival rates.\(^{(12)}\)

Table (1): Distribution of the Study Sample 
According to the Demographical Characteristics

<table>
<thead>
<tr>
<th>Socio-demographic characteristic</th>
<th>Frequency(f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>10</td>
</tr>
<tr>
<td>30-39</td>
<td>12</td>
</tr>
<tr>
<td>40-49</td>
<td>14</td>
</tr>
<tr>
<td>50-59</td>
<td>25</td>
</tr>
<tr>
<td>60-69</td>
<td>26</td>
</tr>
<tr>
<td>70-79</td>
<td>10</td>
</tr>
<tr>
<td>80-89</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Mean ± SD = 4.66± 1.568</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>48</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>7</td>
</tr>
<tr>
<td>Married</td>
<td>87</td>
</tr>
<tr>
<td>Divorce</td>
<td>1</td>
</tr>
<tr>
<td>Widow</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Level of Education</td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>33</td>
</tr>
<tr>
<td>Read &amp; write</td>
<td>14</td>
</tr>
<tr>
<td>Primary School</td>
<td>25</td>
</tr>
<tr>
<td>Intermediate School</td>
<td>10</td>
</tr>
<tr>
<td>Secondary School</td>
<td>7</td>
</tr>
<tr>
<td>Institutes or above</td>
<td>7</td>
</tr>
<tr>
<td>College or above</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
</tr>
<tr>
<td>Employee</td>
<td>7</td>
</tr>
<tr>
<td>Housewife</td>
<td>48</td>
</tr>
<tr>
<td>Free work</td>
<td>25</td>
</tr>
<tr>
<td>Jobless</td>
<td>8</td>
</tr>
<tr>
<td>Retired</td>
<td>11</td>
</tr>
<tr>
<td>Student</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Socio-demographic characteristic</td>
<td>Frequency (f)</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Past Medical illness</td>
<td>Non</td>
</tr>
<tr>
<td>DM</td>
<td>18</td>
</tr>
<tr>
<td>H.T</td>
<td>26</td>
</tr>
<tr>
<td>Heart disease</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Family History of Cancer</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>68</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Smoking</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>63</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Since of diagnosis</td>
<td>Below one year</td>
</tr>
<tr>
<td>1- below 3 years</td>
<td>38</td>
</tr>
<tr>
<td>3 years &amp; above</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>Under weight</td>
</tr>
<tr>
<td>Normal weight</td>
<td>40</td>
</tr>
<tr>
<td>Over weight</td>
<td>33</td>
</tr>
<tr>
<td>Obese</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Type of Cancer</td>
<td>Lung cancer</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>34</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>22</td>
</tr>
<tr>
<td>Leukemia</td>
<td>18</td>
</tr>
<tr>
<td>Brain tumor</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>
**Table (2) Distribution of the Study Sample According to the Medical Data of the whole study samples:**

<table>
<thead>
<tr>
<th>Since of Chemotherapy</th>
<th>Below one year</th>
<th>1- below 3 years</th>
<th>3 years &amp; above</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>47</td>
<td>34</td>
<td>19</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Sessions per month</th>
<th>1-2</th>
<th>3-4</th>
<th>5 and above</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>71</td>
<td>16</td>
<td>13</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table (3) Distribution of cancer patients according to severity of the PTSD**

<table>
<thead>
<tr>
<th>Severity</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>PTSD</td>
<td>No.(%)</td>
<td>No.(%)</td>
<td>No.(%)</td>
<td>No.(%)</td>
<td>No.(%)</td>
<td>No.(%)</td>
</tr>
<tr>
<td>Stress</td>
<td>11</td>
<td>14</td>
<td>28</td>
<td>31</td>
<td>16</td>
<td>100</td>
</tr>
<tr>
<td>Anxiety</td>
<td>9</td>
<td>17</td>
<td>45</td>
<td>18</td>
<td>11</td>
<td>100</td>
</tr>
<tr>
<td>Depression</td>
<td>13</td>
<td>12</td>
<td>30</td>
<td>36</td>
<td>9</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table (4) Distribution of cancer patients according to Severity of the PTSD in relation to their sex**

<table>
<thead>
<tr>
<th>Severity</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>PTSD</td>
<td>No.(%)</td>
<td>No.(%)</td>
<td>No.(%)</td>
<td>No.(%)</td>
<td>No.(%)</td>
<td>No.(%)</td>
</tr>
<tr>
<td>Stress</td>
<td>Male</td>
<td>6</td>
<td>9</td>
<td>13</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>4</td>
<td>8</td>
<td>20</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Male</td>
<td>7</td>
<td>6</td>
<td>21</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>5</td>
<td>12</td>
<td>9</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Depression</td>
<td>Male</td>
<td>9</td>
<td>8</td>
<td>14</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>7</td>
<td>10</td>
<td>12</td>
<td>18</td>
<td>5</td>
</tr>
</tbody>
</table>
Table (5) Distribution of cancer patients according to Severity of the PTSD in relation to their age

<table>
<thead>
<tr>
<th>Severity</th>
<th>20-29</th>
<th>30-39</th>
<th>40-49</th>
<th>50-59</th>
<th>60-69</th>
<th>70-79</th>
<th>80-89</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTSD No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
</tr>
<tr>
<td>Stress</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Mild</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>17</td>
<td>11</td>
<td>3</td>
<td>1</td>
<td>47</td>
</tr>
<tr>
<td>Severe</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Extremely severe</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>25</td>
<td>26</td>
<td>10</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>Anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Mild</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>4</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Moderate</td>
<td>6</td>
<td>4</td>
<td>9</td>
<td>15</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td>47</td>
</tr>
<tr>
<td>Severe</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Extremely severe</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>25</td>
<td>26</td>
<td>10</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Mild</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Moderate</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>15</td>
<td>12</td>
<td>4</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Severe</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Extremely severe</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>25</td>
<td>26</td>
<td>10</td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

Table (6) Relationship between PTSD among cancer patients and patients Age & Financial Status

<table>
<thead>
<tr>
<th>Items</th>
<th>S.O.V</th>
<th>S.S</th>
<th>M S</th>
<th>F. Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTSD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>737.615</td>
<td>122.936</td>
<td>0.613</td>
<td>NS</td>
</tr>
<tr>
<td>Within Groups</td>
<td>15293.385</td>
<td>164.445</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16031.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F critical = 0.748 , DF= 99</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>1433.704</td>
<td>716.852</td>
<td>0.011</td>
<td>HS</td>
</tr>
<tr>
<td>Within Groups</td>
<td>14597.296</td>
<td>150.488</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16031.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. critical= 4.764 , DF= 99</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONCLUSION**

The study detected a severity of the PTSD was moderate in most of the sample, and most of them were breast cancer and prostate cancer. Also founds a significant relationship between PTSD and financial status.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Mental Health Nursing, Iraq and all experiments were carried out in accordance with
approved guidelines.

REFERENCES


Risk Factors of Diabetic Foot among Patients in Al- Hilla Teaching Hospitals

Fakhria JM
A. Prof. Adult Nursing College of Nursing, University of Babylon, Iraq

ABSTRACT
Diabetic foot ulcers (DFUs) are a considerable health and socioeconomic problems, having effects on the quality of life and causing a heavy economic burden on the patients and the communities especially the countries with weak economy. Objectives: identify the risk factors for diabetic foot in patients with diabetes and find out the relationship between the risk factors of diabetic foot with some demographic variables. A descriptive analytic design study was conducted on Non- Probability (purposive sample) of (100) patients with diabetic foot admitted to Al-Hilla teaching hospitals. From 25/11/2015 to 7/10/2016. Most of the patients were male (78%) , and (22%) of them were female. the highest percentage of their age group (54%) their age were between 48-57 years old. this study reported that there were significant relation between the patient ages and the risks factors ,regarding the education status the result showed that the highest percentage of the sample (24%) were at primary school, in addition the present study indicated that the highest percentage of the sample(56%) were nonsmokers. And (70%) of participants did not practice exercises regularly. Finally there was a relationship between patient’s age and duration of disease.

Key words: Diabetic foot, risk factors, ulcer

INTRODUCTION
Diabetes mellitus is a global health problem which may cause a negative effect on the quality of life and imposing a heavy economic burden on the community and the patients. About 370 million people have diabetes approximately in 2012, which accounts for 8.3 % of the world’s population. During the last years there were 668,000 diabetic patients in Iraq. In addition most of those patients will be expected to have various complications, such as diabetic foot which is the most serious problem that lead to amputation of the foot which may obliged them for a long time staying inside the hospital and the need for rehabilitative and home care services. Every hour about 180 lower limbs is lost due to diabetes in the world. Foot complications occur in both forms of somewhere in diabetes and are related more to the duration of illness rather than to the age at onset of disease. However, despite the discovery of new methods of treatment and prevention, and achieving the healing of the ulcers, foot ulcer still remain a considerable challenge. The development of foot problems is not unexpected result of having diabetes, actually most foot ulcers are can be prevent it. However, a recent study indicated that foot ulcer recurrence is still an unresolved issue. Although several therapies have been described for preventing foot ulcers, the rates of ulcerations are very high. The major risk factors causing the lower limb ulcers is diabetic neuropathy which is affecting 50% of all diabetic patients over 60 years old. This condition may be present before the loss of protective sensitivity and it makes them more susceptible to trauma and increased risk of ulcers. A serious challenge for early diagnosis of diabetic patients at high risk of lower limb ulcers is in adequate foot care and foot self-examination. Footwear and sock were taken off. Nevertheless, most of the literatures declared that 85% of diabetic foot problems can be prevented with specific management and care. Moreover, studies emphasized and recommended that adequate intervention and prevention, such as identification of risk factors, diabetic foot care, and education, are critical in reducing the risk of foot ulcers and amputations.
neuropathy, peripheral vascular disease, and structural foot deformities using soft intermediate technology can control this problem.

**METHODOLOGY**

**Design of the study:** A descriptive analytic study

**Sample of the study:** probability (purposive sampling) was selected by randomized system which consists of (100) patients with diabetic foot admitted to Al-Hilla teaching hospital

**Setting of the study:** Al-Hilla teaching hospitals data collected from the period of 4th of January to 5th of June 2016.

**Instruments:** The questionnaire was constructed for the purpose of the study. The Instruments consisted four parts:

- **Part 1:** Demographic Date Sheet: This part concerned with personal information include, the patient (age, gender, education status, marital status, occupation, and address).
- **Part 2:** concerned with clinical information about the disease, which include items: (types of DM, duration of DM, treatment, chronic disease, family health history, smoking, drinking alcohol).
- **Part 3:** knowledge and practice of patients regarding the disease.
- **Part 4:** items related to risk factors of diabetic foot

Data collected through using interview technique to complete the questionnaire was filled by researchers. The items were rated according to Likert type scale which include rating scale (always, some time, never) and scored (3, 2, 1) Respectively. Importance and objectives of study where explained to each participant member of sample before initiating the study. All participants were informed that there participations were voluntary and confidentially. Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 19. Through the application of descriptive statistical data analysis include (Frequencies, Percentages, and Cum. Percent) and Pearson Correlation.

**RESULTS AND DISCUSSION**

Table (1) showed the characteristic of demographical variables, most of the patients were male (78%), The highest Percentage of their age represented (54%) was in age group between 48-57 years old. Regarding the educational level the results indicated that the highest percentage (24%) were at primary school level, while their occupations (38%) had private work. The highest percentage (72%) of the sample were city residents, and (62%) were married. Table (2) indicated that (56%) of the sample were nonsmoker, and the highest percentage of them not drinking alcohol (96%). Regarding the chronic diseases the results revealed that (39%) Patients had chronic diseases and most of them had hypertension (22%), while regarding family health history (44%) of them had heredity diseases, and the highest percentage (22%) had diabetes mellitus. Table (3) declared that the highest Percentage (54%) of the sample had DM type 2, while those who had type 1 DM (46%) of them use insulin injection. Regarding the duration of DM the result showed that the highest percentage (42%) had DM for more than 7 years. Table (4) showed that (70%) of study samples were never practice sports regularly, (38%) of them always feel numbness and tingling in their feet and (66%) of study samples always take their medication regularly, while (52%) of them sometime (38%) visit the doctor or hospital to change the dressing of their wounds, moreover (42%) of them always the nurse or doctor check their peripheral pulsation in addition, (62%) of the sample sometime loss sensation in their feet and the majority of them (94%) didn’t have amputation in other foot. Table (5) Presenting that (44%) of the study samples sometime inspected their foot daily, and (70%) of them always wear tight shoes. While (44%) of them always wear cotton socks. However (42%) of them sometime clean their foot with soap and warm water daily, and (46%) of samples always use alcohol or other antiseptic solution in cleaning their foot daily. Moreover (42%) always keep their foot in good hygiene. Table (6) showed that most of samples (30%) get the injury from stepping on piece of glass. However the lowest percentage (8%) had the injury because of something heavy fall on their feet. Table (7) showed a significant relationship between the patient age and the duration of disease, finally results indicated that there was a relationship between the educational level and duration of disease. The current study showed prevalence of disease among males more than in females in contrast other study carried out by Grillo and Gorini (2007) they reported that this disease is common in female than male. The increased in life expectancy for example
has increased the prevalence of DM, since the disease tends to increase with increasing age\textsuperscript{13}. It’s suggested that individuals with high level of education have better understanding of their disease and are more aware of suspected complications which may occur. Moreover, recent statistical analysis proved that the educated group was significantly better in terms of foot care\textsuperscript{14}. The result of the current study is consistent with previous studies which found an association between diabetic foot and illiteracy\textsuperscript{15}. Another study indicated that incidence of diabetic foot was positively influenced by education\textsuperscript{16}. The patients with higher education participated in foot self-care programs more than patients with lower levels of educations\textsuperscript{17,18}. Furthermore, the less educated patients were also more likely to be seen by the health care team as noncompliance to their medications regimes, in addition, education is considered as the key to better health as it enhances the individuals to better management, treatment and controlling this disease. Even though the association between education and diabetic foot was evident from the above results, but still large number of patients do not receive adequate information and instructions about the disease process. A cross sectional study found that 78.4% of patients had poor information about foot care\textsuperscript{15}. Another study showed statistically significant associations between level of education and effective diabetic foot practice\textsuperscript{18} furthermore a study conducted in Iran found that 7.5% of subjects attended an educational program about self-care to prevent foot ulcers\textsuperscript{19}. The result of this study revealed that proper foot care was a protective factor that decreases the chance of developing foot complications among diabetic patients, and on the other hand, poor foot care would be a risk factor for foot ulcers. Balla et al. (2013)\textsuperscript{20} reported that lack of self –care of foot was associated with developing diabetic septic foot. Similar results concerning the longer duration of diabetes and development of diabetic foot were revealed by other researchers\textsuperscript{21} who reported that the long duration of DM (7-15Years) can lead to developing diabetic foot. Reports from Mayo Clinic and other literatures\textsuperscript{22,23} showed that the earlier you develop diabetes, and the less controlled blood sugar , the higher the risk of complications. Study carried in Dar es Slaam\textsuperscript{24} concluded that mean knowledge score of patient influenced by duration of diabetes 5 years was very low.

<table>
<thead>
<tr>
<th>Table (1): Distribution of Demographical Characteristics among diabetic patients (No. 100).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A-Demographical data</strong></td>
</tr>
<tr>
<td>1.-Gender:</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>2.-Age:</td>
</tr>
<tr>
<td>(18-27) yrs.</td>
</tr>
<tr>
<td>(28-37) yrs.</td>
</tr>
<tr>
<td>(38-47) yrs.</td>
</tr>
<tr>
<td>(48-57) yrs.</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>3- Educational status:</td>
</tr>
<tr>
<td>Unable to read &amp; write</td>
</tr>
<tr>
<td>Can read &amp; write</td>
</tr>
<tr>
<td>Primary school</td>
</tr>
<tr>
<td>Collage graduation</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>4- Marital status :</td>
</tr>
<tr>
<td>Single</td>
</tr>
<tr>
<td>Married</td>
</tr>
<tr>
<td>Divorce</td>
</tr>
<tr>
<td>Widow</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>5- Address:</td>
</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>Rural</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>5- Occupation :</td>
</tr>
<tr>
<td>Private work</td>
</tr>
<tr>
<td>Employ</td>
</tr>
<tr>
<td>Retired</td>
</tr>
<tr>
<td>Housewife</td>
</tr>
<tr>
<td>Unemployed</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
Table (2) Distribution of the sample according to disease information

<table>
<thead>
<tr>
<th>Disease information</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of (DM)</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Type 1</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injection Insulin</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Oral insulin</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Total samples use insulin</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Duration of (DM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-4yrs</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>5-7yrs</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>More than 7 years</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table (3) Distribution of the studied sample according to patients self-care practices

<table>
<thead>
<tr>
<th>self -care practices</th>
<th>Always</th>
<th>Sometime</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>1-Did you Practice sports regularly</td>
<td>8</td>
<td>22</td>
<td>70</td>
</tr>
<tr>
<td>2-Did you feel numbness and tingling in your feet</td>
<td>38</td>
<td>34</td>
<td>28</td>
</tr>
<tr>
<td>3-Did you take your medication regularly?</td>
<td>66</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>4-Did you follow special nutrition program?</td>
<td>24</td>
<td>52</td>
<td>24</td>
</tr>
<tr>
<td>5-Did you have hypercholesterolemia?</td>
<td>22</td>
<td>24</td>
<td>34</td>
</tr>
<tr>
<td>6-Did you visit the doctor or go to hospital to dressing your wound?</td>
<td>36</td>
<td>38</td>
<td>26</td>
</tr>
<tr>
<td>7-Did the nurse or doctor check your peripheral pulsation?</td>
<td>42</td>
<td>38</td>
<td>20</td>
</tr>
<tr>
<td>8-Did the nurse or doctor assess your feet?</td>
<td>40</td>
<td>38</td>
<td>22</td>
</tr>
<tr>
<td>9-Did you Loss sensation in your feet?</td>
<td>22</td>
<td>62</td>
<td>16</td>
</tr>
<tr>
<td>10-Did you have changing in appearance of your foot?</td>
<td>24</td>
<td>32</td>
<td>44</td>
</tr>
<tr>
<td>11-Did you have amputation in other foot?</td>
<td>6</td>
<td></td>
<td>94</td>
</tr>
</tbody>
</table>

Table (4) Distribution of the studied sample according to patient’s hygiene practice of the foot

<table>
<thead>
<tr>
<th>Items related to the hygiene practice of the foot</th>
<th>Always</th>
<th>Sometime</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Did you inspect your foot daily?</td>
<td>38</td>
<td>44</td>
<td>18</td>
</tr>
<tr>
<td>2-Did you wear tight shoes?</td>
<td>70</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td>3-Did you wear cotton socks?</td>
<td>44</td>
<td>42</td>
<td>14</td>
</tr>
<tr>
<td>4-Did you clean your foot with soap and warm water daily?</td>
<td>40</td>
<td>42</td>
<td>18</td>
</tr>
<tr>
<td>5-Did you use alcohol or other antiseptic solution in cleaning your foot daily?</td>
<td>46</td>
<td>32</td>
<td>22</td>
</tr>
<tr>
<td>6-Did you keep your foot in good hygiene?</td>
<td>42</td>
<td>32</td>
<td>26</td>
</tr>
</tbody>
</table>
Table (5) Distribution of the studied sample according to patients' accidental injuries of the foot

<table>
<thead>
<tr>
<th>Accidental injuries of the foot</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hit something hard</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>stepped on a sharp object</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>stepped on a piece of glass</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Something heavy fall on foot</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Wearing tight shoe</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

CONCLUSION

This study found several factors associated with higher incidence of diabetic foot among diabetic patients including: low educational level, being on insulin treatment, longer duration of diabetes (more than 7 years), being current smoker or ex-smoker, poor self-care of foot, and lack of education. Emphasis should be directed toward health education and identify the risk factors which are modifiable.

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


Role of Language, Healing Power of Words and Communication Skills in Improvement of Healthcare Quality and Healing Outcomes

Rafid Hadi Hameed
Ministry of Public Health, Maysan Health Department, Maysan Governorate, Iraq

ABSTRACT

Language, communication skills and healing words have been found to have a great impact on health care improvement. When handling patients, the nurse and other medical personnel ought to communicate effectively to the patients and in the process provide the necessary medication, care and support to the patient. We aim to ascertain the claim that language used by nurses impacts patients positively to boost the healing power hence improving the quality of health care in general. We utilized a research that included 151 participants who were chosen from a survey using purposive sampling. 56% of those participants stated that they felt a relieve after they were told kind words by the medics who carried out clinical an investigation on them. Also, the study found that majority of the participants who had been told unkind words went back to those health facilities due to circumstances. It was also found that a majority of the medics were not well versed with communication skills. This affected the quality of healthcare. Patients are more satisfied when addressed in kind language and with quality communication skills. Also, good communication minimizes medical errors.

Keywords: Healing, communication, language.

INTRODUCTION

Communication is vital to the healthcare system. Patients need to be handled by physicians who have excellent communication skills. The language used by the medical personnel should be able to impact the patients positively to boost the healing power hence improving the quality of health care. The communication skills needed in this context go beyond the basic skills which are taught in medical schools. Generally, the patients communicate their symptoms to the health care experts who have the role of questioning them further to know their medical history. The medics rely on the patients’ information in carrying out medical investigation and hence lack of good communication skills may make the patient omit a vital ace which could make the results of the medical investigations unreliable. Application of effective communication makes the patients more open and increases their satisfaction hence making the treatment process better. Patient satisfaction leads to improved health care and it can only be achieved through effective communication. To improve the community healthcare system, all the diverse language needs and mode of communication-based on beliefs and values should be met. According to the Agency for healthcare research and quality (AHRQ), effective communication increases safety and improves the overall community healthcare system. The mode of communication and the language used should be simple and easy to understand, it should also be short and precise without any offending words. Since not all healthcare systems practice effective communication, this paper will be based on the role of language, the healing power of words and communication skills in improving the health care system.

MATERIALS AND METHOD

Study sample and methods
A sample of 150 participants was drawn for the analysis using a purposive sampling method. This large sample has been considered so that the assumption of normality can be upheld. It aligns with the central limit theorem which states that as the sample size increases, the data tends to approach the normal distribution. This will eliminate any chances of biasness which may occur during the analysis. On the other hand, purposive sampling has been chosen since it is the most effective method of selecting a sample from a survey. This is a non-probability sampling method which is used to select samples for study based on set rules and guidelines. The sampling method will ensure that the participants meet all the required rules.

Instrumentation

A questionnaire will be the main tool for data collection in this research. The Questionnaire will be designed and uploaded online as a survey for people to participate. This tool of data collection has been selected since it saves time as many participants can respond at once. It is also a good tool for collecting empirical data.

Data collection

After the questionnaire has been uploaded online as a survey, people will be allowed to participate for a period of two days. Out of all participants 151 of them will be selected using purposive sampling and their data will be used in this study. The questionnaires will first be downloaded and then the data will be entered into an excel file. Data cleaning will then be carried out before analysis.

Variables and data analysis

Ordinal, nominal, and scale variables will be included in the study based on the nature of the question. Demographic information will also be included. Among the demographic information which will be included are age and gender. Both parametric and non-parametric analysis will be used. A parametric analysis will be applied to the scale data and non-parametric analysis will be applied to the scale data. This will make sure that the results are reliable and scientifically justifiable.

RESULTS AND DISCUSSION

Out of the 151 participants, 40.4% (61 out of 151) were males and 59.9% (90 out of 151) were females. This aligns with another study that females are more vulnerable to diseases as compared to men. Also, the mean age of the participants was 35 years old with the maximum age being 65 and minimum being 11 years old. The mean age suggests that the prevalence of any kind of disease among the young people has increased over the recent years hence contradicting the earlier findings that old people are more affected by diseases than young people. Among all the 151 participants, 13.9% (21 out of 151) stated that they visited the hospital once a month, 3.3% (5 out of 151) said they visited the hospital twice a month, 60.9% (92 out of 151) said they visited the hospital thrice a month. This means that there is a need for the healthcare bodies to train the staff on how to effectively communicate with patients so that they can remain optimistic and improve their health performance. Out of the 57 participants who said they had been told kind words by the medics, 37% (56 out of 57) said that the kind word impacted them psychologically with only 0.7% (1 out of 57) saying that the kind words did not impact him psychologically. This shows that communication has power and it can make the patient improve. The findings support the earlier researches which found that healing words, good communication skills, and language used impacted the performance of healthcare. Communication should not be ignored and all the staff members of any healthcare should be given proper training to enhance patients’ satisfaction. Among those who said that they had not been told kind words, only 8.6% said that they had been satisfied by the service offered on the healthcare facilities they visit with 81% saying that they are not satisfied. This shows that for the patients to be satisfied, communication is key. Also, other studies found that communication affects the psychological compounds of the body and determines the nature of those compounds and the effects on the brain.
quality communication eliminates anxiety, fear and other psychological compounds hence improving the health quality of that person. Those who were told unkind words the majority of them were not willing to go back to those health facilities. Only 6% preferred going back with 55% saying that they were not willing to go back to those health facilities. Those who were willing to go back, 2% said that it was the only place where they could get help with 2.6% saying that they understood that people can have different communication skills. Also, 2.6 said that the facilities were cheap hence preferred going back. This means even those who were willing to go back, circumstances forced them to do so. From the analysis, it is evident that many patients were impacted by good and quality communication skills from the medics. Most of them were willing to go back those facilities where the medics used kind words. This shows that there is a strong relationship between the kind of language used and the level of satisfaction among the patients. Adoption of good communication skills improves the healthcare of a population. \[19\] Consideration language barriers also make the patients more satisfied and hence willing to visit given healthcare facilities again. The language also plays a key role in the enticing the patients to give all the key information required to carry out a medical investigation successfully. \[20\] It’s a common belief that emotions are inbuilt feelings which have no relation with the words used to describe them. However, according to a recent study, it has been found that language is a fundamental element in emotions since it dictates the emotion experiences and perceptions. \[1\] The psychological constructionist conceptual act theory (CAT) claims that emotional instances occur when information from one person is made meaningful to another person in light with the prevailing situation. \[1\] The nature of the emotion is however determined by the language used in the process of creating that instance. This places language and communication skills in center of impacting the personality of an individual. The psychological compounds like fear, anger, excitement, anxiety, and others, emerge when more basic psychological elements such as body language, quality of voice, the quality of words, and the mode of communication combine. \[3\] The combination of this elements leads to the creation of a concept of knowledge about the state of the body which in turn contributes to the decision of which compound should the body adopt. This means the basic elements influence the generation of the psychological elements. Medics who lack good communication skills and healing words may lead to the creation of anxiety and other negative psychological compounds among the patients hence affecting their hope. According to the CAT theory, the basic elements of the body contribute to emotions and other mental states which affect the way of life and the lifespan of an individual. These basic elements are either inside or outside the body. \[2\] The basic elements inside the body (known as effect) create the inseparable positive psychological compounds. On the other hand, the external basic elements (known as exteroceptive) influence and dictate the change of the inside basic elements. \[2\] These external elements come from the environment and from other people. They are transmitted through the five senses. The mode of receiving them and internalizing dictates the level of impact to the internal basic elements. According to the Muslims, there are many ways which the medics can use to improve the healing power among the patients. The patients should be cautioned against gluttony but using peaceful words which will not injure their souls. \[21\] Also, the patients should be advised on how to eat moderately so as to remain with healthy bodies. In addition, the patients should withhold from any form of medication which stirs up illness. \[21\] The patients should also be taught how to remain calm during illness and how to abstain from certain foods which can make them sicker. According to the Muslims, healing should not only be based on the body but also on the soul since the healing of the soul brings about the healing of the body. From the analysis of the psychological elements, it is evident that it is only through good communication channels and good communication channels which can make patients develop the positive inside psychological compounds.
Table 1: Demographic information on Gender, Visit Hospital and Relieve of participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender Valid</td>
<td>Male</td>
<td>61</td>
<td>40.4</td>
<td>40.4</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>90</td>
<td>59.6</td>
<td>59.6</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>151</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Visit Hospital Valid</td>
<td>once a month</td>
<td>21</td>
<td>13.9</td>
<td>13.9</td>
</tr>
<tr>
<td></td>
<td>twice</td>
<td>5</td>
<td>3.3</td>
<td>17.2</td>
</tr>
<tr>
<td></td>
<td>thrice</td>
<td>92</td>
<td>60.9</td>
<td>78.1</td>
</tr>
<tr>
<td></td>
<td>more than thrice</td>
<td>33</td>
<td>21.9</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>151</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Relieve Valid</td>
<td>Yes</td>
<td>56</td>
<td>37.1</td>
<td>98.2</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1</td>
<td>0.7</td>
<td>98.2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>57</td>
<td>37.7</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>1</td>
<td>37.7</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>94</td>
<td>62.3</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2: Demographic information on age of participants

<table>
<thead>
<tr>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>151</td>
<td>11</td>
<td>65</td>
<td>35.45</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>151</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Data on whether participants have ever been told kind words by medics

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>57</td>
<td>37.7</td>
<td>37.7</td>
<td>37.7</td>
</tr>
<tr>
<td>no</td>
<td>94</td>
<td>62.3</td>
<td>62.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>151</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Data on satisfaction of the participants

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>13</td>
<td>8.6</td>
<td>13.8</td>
<td>13.8</td>
</tr>
<tr>
<td>No</td>
<td>81</td>
<td>53.6</td>
<td>86.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>62.3</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>111</td>
<td>57</td>
<td>37.7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>151</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5: Data on whether participants prefer going back where they were told kind words

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>yes</td>
<td>10</td>
<td>6.6</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>84</td>
<td>55.6</td>
<td>89.4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>94</td>
<td>62.3</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td>111</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>151</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Data on the reasons for going back

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>a</td>
<td>3</td>
<td>2.0</td>
<td>27.3</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>4</td>
<td>2.6</td>
<td>36.4</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td>4</td>
<td>2.6</td>
<td>36.4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>11</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td>111</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>151</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSION

Our study found that majority of the participants who had been told unkind words went back to those health facilities due to circumstances. It was also found that a majority of the medics were not well versed with communication skills. This affected the quality of healthcare. Patients are more satisfied when addressed in kind language and with quality communication skills. Also, good communication minimizes medical errors.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Maysan Health Department, Maysan governorate, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Assessment of Neonatal Screening Program over 5 years in Karbala Governorate

Fatimah Mohammed Taj-Aldeen¹, Ali Abdulridha Kadhim Abutiheen², Mohammed Firas K. Al-Abadi³, Abbas Faddil ALkhafaji⁴

¹Primary Health Care Department, Karbala Health Directorate, Karbala, Iraq, ²Family and Community Medicine department-College of Medicine - University of Kerbala, Karbala, Iraq, ³Karbala Teaching Hospital for Children, Karbala, Iraq, ⁴Imam Hussein Medical City, Karbala, Iraq

ABSTRACT

Objectives: To assess the program applied at Karbala Health Directorate, and to estimate the incidence of congenital hypothyroidism, phenylketonuria and galactosemia in Karbala. A cross-sectional study that involves all newborn below than 1 month underwent screening from the beginning of program at the first of April 2013 to 31 of March 2018 (5 years). Including all 4 health districts which belongs to Karbala Health Directorate. By reviewing of their records and screening results and further analyzing the data. The coverage rate of the program was 71.7%. The incidence of congenital hypothyroidism was 1:1538 and male to female ratio was 1:1, the incidence of phenylketonuria was 1:7692 and incidence of galactosemia was 1:9345. And the positive predictive value of congenital hypothyroidism was 40.8%, for phenylketonuria was 51.8%, was 8% for galactosemia. The program important and effective and need to be expanded to cover all Iraq. However, the coverage rate in Karbala Health Directorate was suboptimal compared to the international standard as well as the overall results of screening test, age of screening sampling, lab performance and fallow up were below the international standard.

Keywords: Newborn screening, (PKU) Phenylketonuria, (GALT) Galactosemia, (CH) Congenital hypothyroidism, Coverage rate, Karbala.

INTRODUCTION

Newborn screening (NBS) is a comprehensive system that includes laboratory testing, diagnosis, follow-up, treatment, education, and evaluation. To be effective and successful, the NBS system requires continuous quality improvement focused on information sharing, technical assistance and standardized data. The story of neonatal screening dates occur in 1959 when Dr Robert Guthrie established a test to discover extreme phenylalanine amounts by microbiological bacterial inhibition test on the dry blood spot (DBS) taster gathered on a filter paper (F.P) which also called with (Guthrie card) to confirm phenylketonuria in all neonate ¹,². Globally, at least 7.6 million children are born yearly with severe genetic or congenital malformations; 90% of them are born in mid and low income countries. In the Middle East and North Africa area (MENA), the population in the area exceeds 400 million. With elevated birth rate and a probable ten million neonates birth yearly. The bulk of the population is of the Islamic belief and commonly Arab. The residents is characterized by a high consanguinity (25–70%) and a high percentage of first-cousin marriages ³,⁴. Evaluation of any new program is important and vital to recognize any difficulty or obstacles, increase the productivity or consumption, better delivery mechanisms, to be more effective and confirm that the program is fulfilling or working towards its objectives ⁵,⁶. Newborn screening program was assessed in different areas of the world with variation in results ⁷,⁸. Including one study conducted in Baghdad by Alkhazrajy and Hassan in 2014 ⁶. This study aimed to assess the NBS program implementation in Karbala.
governorate over 5 year period.

METHODOLOGY

A cross-sectional study, conducted at Karbala Health Directorate. It includes all infants from all four primary health districts (Kerbala Center, Husseiniya, Alhur, and Al-Hindiyah health districts). The records of all registered screened neonates from the beginning of the program at April 1, 2013 till March 31, 2018 were reviewed and included. The information about the number of live births for each year obtained from the ministry of health annual statistical report for the years 2014-2017 and from Statistics section in Karbala health Directorate regarding the period of April-December 2013, and January-March 2018. Recording data of any neonate on filter paper which include demographic data of neonate. The appropriate time for blood sampling is not before 72 hours of life up to 5 days. Based on information from chief personnel in Karbala CPH, PKU and GALT screening test results were taken from Central Public Health Laboratory while the result of confirmatory test for PKU and galactosemia takes place outside Iraq (Jordan) by tandem mass spectrometry (TMS). Positive screening tests results detected then the test is repeated in the same filter paper, if it is still positive then confirmatory tests should be performed to confirm CH by taking blood serum sample while in case of PKU and GALT a new filter paper is used for confirmation. Within program, follow up of neonates were done through Karbala Teaching Hospital for Children (Screening program unite) and Al-Hindai General hospital. So the number of children who diagnosed with confirmatory test and/or loss to follow up, number of children with regular visit to hospital were obtained from there. Primitive screening test for CH was done by measure TSH (thyroid stimulating hormone) level by using DELFIA technique. When the primitive screening results are abnormal, blood should be collected by venipuncture as soon as possible to confirm the abnormal screening results by using MINI VIDAS SYSTEM. The result of those three disorders calculated regarding the cutoff value which as follow: CH (TSH>9.1 µU/ml), PKU(n phenylalanine: 10-150 µM/L, Tyrosine: 10 - 200 µM/L, Phenylalanine/Tyrosine ratio: 0.28-3.0) and for GALT(n total galactose: < 9.9 mg/dl, (GALT) G 1-p uridyl transferase: >3.0 U/g Hb). (Adopted by Central Public Health Laboratory in Karbala). Ethical approval was obtained from research ethics committee in College of Medicine/University of Kerbala official permission obtained from Karbala Health Directorate.

Statistical analysis:

The following equation was used:

1. Coverage rate = \( \frac{\text{Number screened}}{\text{Number should be screened}} \) * 100

2. Incidence for each disease = \( \frac{\text{New case for each disease}}{\text{Number of lived birth}} \) * k

3. Percentage of neonate with positive screening test = \( \frac{\text{Number of positive screening test}}{\text{Number screened}} \) * 100

4. Positive predictive value = \( \frac{\text{Number of positive confirmatory test}}{\text{Number of +ve screening test}} \) * 100
Data of patient records were entered and analyzed using the statistical package for social sciences (SPSS) version 23. Specific program indicators include age at sampling, time taken to deliver the specimen to Central Public Health Laboratory, elapsed in lab and neonate age when treatment was initiated and compared to international standard.  

RESULTS AND DISCUSSION

The total number of live births neonates during the period between April 1, 2013 to March 31, 2018 were 213615 neonates while the neonate that screened were 153281 neonates, the total coverage of screening program was 71.7%. At same 5 years period, from all neonates screened, the total number of positive screening test for the three screened disease were 681. Those who test positive were invited by phone calling to do second confirmatory test, only 25 family had not been informed or reached because a wrong phone number might be given or not answering the calls. From those who informed about primitive test result 418 families respond to call and done the confirmative test, 238 families did not attend for the confirmatory test. From those who response to call and done the confirmatory test, 191 neonates had positive confirmatory test, 12 neonates had borderline result and 215 neonates had negative confirmatory test. The number of neonate with positive screening and diagnostic test, percentage of neonate with positive screening and confirmatory test and incidence for the five years are shown in table 2. The mean age at first sampling for those with positive screening test was 11.4±7.8 days and median was 10 days. The percentage of neonate that done the first sampling at age ten days and younger was calculated for five years (61.6%). The percentage of screening card samples to be received by the laboratory within 6 days of being taken was also measure for each year and this showed in following figure 1. The percentage of result to be available within four working days from date of received to lab was also measure for each year and this showed in figure 2. The mean age at second sampling was 26.5±9.8 days and median was 23 days. The percentage age of neonates who diagnosed and received appropriate treatment by 28 days of age for the five years (66.2%). The numbers of children with regular follow up for congenital hypothyroidism were 67 (53.6%) while those children those losses to follow up were 58 (46.4%). The numbers of children with regular follow up for PKU were 22 (91.6%) while those children those losses to follow up were 2 (8.4%). The numbers of children with regular follow up for galactosemia were 4 (25%) while those children that losses to follow up were 12 (75%). The male (74) to female (65) ratio for CH was 1.1:1. This is the first study in Karbala governorate to assess NBS, the universal coverage of newborn screening program in Karbala city was 71.7%. This average coverage rate is below the international standard (99%). However, this rate is higher than a study done at 2014 in Baghdad city where the coverage rate was 66%. But this rate is lower than other studies conducted in nearby countries were it was 82.7% in Alexandria, Egypt, 95% in the United Arab Emirates and 97% in Saudi Arabia (Al-Madina Al-Munawara region. The difference in coverage rate could be related to difference in availability of health services and human resources as well as the efficiency of health system. Anyhow this result or that in Baghdad is not unexpected and might even considered good as a newly introduced program. If take in account the status or context of the health system and health services in Iraq which suffer many crises. Where even the immunization coverage are below the international figures. It could be attributed to the low percentage of the first visit of neonates to PHC centers and lower awareness and knowledge of families about NBS program. For Congenital hypothyroidism, the overall incidence was 1:1538. In compare to other countries, in Iran the incidence was 2/1000. while CH incidence before the program in Turkey was recorded as (1/2736–1/2326) (26, 27) .This difference in the incidence may be due to different TSH cutoff values, and may also due to regional different in the levels of iodine deficiency. The result of program for CH revealed that male to female ratio was 1:1.1. There are varying findings about congenital hypothyroidism occurrence risk with regard to gender. Some researchers have showed that CH occurrence is associated with boy gender. whereas others have found an increased risk of CH in girls. or no variation. The positive predictive value (PPV) for CH was relatively low (40.8%). This low PPV of the program was similar to a study in Iran (33%). The program had relatively high positive screening test percentage (0.21%), in compare to other Iraqi study that done in Baghdad pooled positive screening test percentage (0.047%). The cause behind this may be related to transient abnormalities of thyroid function in the newborn period(6, 28-31). Based on finding of this study, the total incidence of PKU in Karbala governorate was 1: 7692. This ratio varies in different countries; in Iran the incidence was...
The highest incidence was found in Arabian countries (more than 1:5000) and Turkey (1:2600). Reasons behind this difference may be hereditary factors, awareness of families, consanguinity marriages and different in coverage rate of testing which use to diagnose the disease(14, 32). Regarding the galactosemia, the overall incidence was 1:9345. While the frequency of galactosemia in Southern Iran was 1:6000. In other hand, the incidences of galactosemia in the countries which have pilot programs on galactosemia are different for example, among the White Americans it is around one patient in 47000, in United Kingdom one patient in 70000, and in Ireland one patient in 23000. The incidence in this study was being higher than that in other countries, this might be because the number of consanguineous marriages is higher than other populations. The appropriate age of sampling in the NBS was a matter of debate. The optimum age of sampling dependable on various causes as, the number of disorders investigated for and screening technique 12. A comparison of timeliness of the screening program indicators in this study shows that some of newborn screening program indicators was improve between 2013 and 2018 like elapsed in laboratory for less than 4 days, from 62.9% in 2013 to 70.6% in 2017/2018, according to international standard the percentage should be 100%. This improvement in percentage may be due to the training provided to laboratory technicians and adding new laboratory staff. Also the age at start treatment before 28 days from 25% in 2013 to 82% in 2017/2018, according to international standard the percentage age should be 95%. This about program among health care provider 1, 19. About children follow up in hospital, the high percentage of loss to follow up in case of galactosemia may be due to unavailability of special milk formula for those children while the cause of high follow up in case of PKU may be due to availability of special milk formula for those children. For CH about half of children were lost, the cause may be due to unavailability of special drug for that disease and other half who had regular follow up to hospital was follow for checkup investigations.

Table 1. Coverage rate of Neonatal screening program in Karbala over 5 years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Live birth neonates (N)</th>
<th>Screened Neonates (N)</th>
<th>Coverage rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>April -December 2013</td>
<td>31243</td>
<td>19071</td>
<td>61%</td>
</tr>
<tr>
<td>2014</td>
<td>43943</td>
<td>35244</td>
<td>80.2%</td>
</tr>
<tr>
<td>2015</td>
<td>41894</td>
<td>35453</td>
<td>84.6%</td>
</tr>
<tr>
<td>2016</td>
<td>42757</td>
<td>28565</td>
<td>66.8%</td>
</tr>
<tr>
<td>2017</td>
<td>43296</td>
<td>27264</td>
<td>62.9%</td>
</tr>
<tr>
<td>January -March 2018</td>
<td>10482</td>
<td>7684</td>
<td>73.3%</td>
</tr>
<tr>
<td>Total</td>
<td>213615</td>
<td>153281</td>
<td>71.7%</td>
</tr>
</tbody>
</table>

Table 2 -Number and percentage for screening and confirmatory test and incidence for congenital hypothyroidism, PKU, and Galactosemia for 5 years.

<table>
<thead>
<tr>
<th>Disease</th>
<th>+ve ST (N)</th>
<th>% of +ve ST</th>
<th>+ve CT (N)</th>
<th>PPV</th>
<th>Incidence /10000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congenital hypothyroidism</td>
<td>340</td>
<td>0.22%</td>
<td>139</td>
<td>40.8%</td>
<td>6.5:10000 (1:1538)</td>
</tr>
<tr>
<td>PKU</td>
<td>56</td>
<td>0.036%</td>
<td>29</td>
<td>51.8%</td>
<td>1.3:10000 (1:7692)</td>
</tr>
<tr>
<td>Galactosemia</td>
<td>285</td>
<td>0.18%</td>
<td>23</td>
<td>8%</td>
<td>1:10000 (1:9345)</td>
</tr>
</tbody>
</table>
CONCLUSION

Neonatal screening program is an important and effective program. The coverage rate in Karbala is lower than international standard. The incidence of three screened disease was considered as high. Lab performance was suboptimal in compare to international standard. However, the program need to be promoted and expanded to cover all Iraq. Community awareness about the program need to be raised. Improve recall system for defaulters to take second sample which is consider very important for confirmation of disease. Increase training for laboratory staff to improve their performance. Providing drugs and special milk formula to support children and decrease the loss to fallow up.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Primary Health Care Department, Karbala Health Directorate, Karbala, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


12. Hettiarachchi M. Indicators of newborn screening


Assessment of Patient’s Knowledge about Cardiac Catheterization

Haider Jassim Hamid
University of Baghdad/ University Health, Baghdad / Iraq

ABSTRACT

Objective: assess the knowledge regarding coronary catheterization among patients undergoing to this procedure. The descriptive cross-sectional study was conducted at Iraqi center for heart diseases. Adult patients scheduled to undergo diagnostic cardiac catheterization. This study took place between Julia 10th 2018 to November 30th 2018. Totally; 120 patients in the study sample. Knowledge assessment tool was prepared to assess the level of knowledge for patient concerning cardiac catheterization which is comprised of three sections: A- Coronary artery disease: contains (7) questions (multiple choice questions). B- Cardiac Catheterization procedure: contains (20) questions (yes or no questions). C- Recovery and follow-up when you get home: contains (7) questions (yes or no questions). Overall Main Domains knowledge scale most patients 102 (85%) has score range low high (25-49) and mean of score (0.37). Lack of information about the coronary catheterization among patients in Iraqi center for heart diseases.

Keyword: knowledge, coronary catheterization, patients.

INTRODUCTION

Cardiovascular diseases are the number 1 cause of death globally: more people die annually from CVDs than from any other cause. According to World Health Organization, about 18 million deaths occurred due to cardiovascular diseases and this value has been estimated to reach 23 million by 2030. Cardiac catheterization is the gold standard examination used for diagnosis of coronary artery disease. The catheterization is considered the method of choice to examine coronary anatomy and to investigate heart disease, which can provide additional information for decision making. Coronary angiography in parallel with the increase in the incidence of coronary artery disease is an invasive approach applied more frequently. The use of coronary angiography for diagnosis of cardiovascular disease and subsequent percutaneous coronary interventions (PCI) as an alternative treatment to surgery for revascularisation of heart tissue is increasing. Cardiac catheterization is the insertion and passage of small plastic tubes (catheters) into arteries and veins to the heart to obtain x-ray pictures (angiography) of coronary arteries and cardiac chambers and to measure pressures in the heart (hemodynamics). In Iraq; the Patient Rights Charter (PRC) was developed by the Ministry of Health The most important professional obligations to the practitioner of the medical profession the medical practitioner must make sure that his patients Have been told faithfully With sufficient information about remedial action And their consequences before They agree to the treatment. He should realize that patients the patients understood exactly what they were told about treatment. In 2016, according to Ministry of Health / Environment of Iraq, number of cardiac catheterization in Baghdad (15573) And in Iraq as a whole (43778). There are a number of activities to be undertaken to prepare patients for cardiac catheterization. As with all invasive procedures, the patient should be informed about the purpose, benefits and risks of the procedure and any diagnostic alternatives. The nurses and physicians have an important role in providing information to patients. Furnishing patients with necessary information about cardiovascular procedures is important for improved health of individuals and the society at large, and there seems to be a considerable gap in this respect. Patients who acquire a greater degree of knowledge about their
health problem tend to be more confident for self-care and adopt better adherence to treatment. Anxiety and stress that occurs in patients result in increased blood pressure. Ongoing anxiety and stress may cause transient tachycardia, angina and myocardial ischemia. Lack of knowledge about methods of diagnosis and treatment is one of the major causes of anxiety.

**METHODOLOGY**

The descriptive cross-sectional study was conducted at Iraqi center for heart diseases. Adult patients scheduled to undergo diagnostic cardiac catheterization. This study took place between Julia 10th 2018 to November 30th 2018. Totally; 120 patients in the study sample. The criteria for selecting the study sample are: (1) Patients visiting the center to undergoing angiography. (2) Patients who agree to participate in the study. (3) Male and female Patients. (4) Able to communicate, read and write. (5) Patients haven’t history of prior angiography. (6) Ad Hoc percutaneous coronary interventions.

The researcher has chosen this hospital for the following reasons:

1. A specialized center for heart surgery.
2. A large number of patients, visiting the center, request diagnosis and treatment.

A consent form is also necessary; the consent form has insured informed and that the rights of human subjects are protected. To maintain security of the consent form during the study, they are kept in a file in the drawer of the investigator’s home.

**Instruments Development**

The study was conducted through using the structured questionnaire. A data-collecting form includes two parts:

**Part I: Demographic Characteristics of the Patients.**

Demographic features consist of the following questions: (age, gender, area of residency, marital status, educational levels and occupation).

**Part II: clinical data and medical history**

(Diabetes Mellitus, Hypertension, Family history of coronary artery disease Duration of heart disease).

**Part III: Questionnaire Related to Patients’ Knowledge concerning coronary catheterization).**

Knowledge assessment tool was prepared to assess the level of knowledge for patient concerning cardiac catheterization which is comprised of three sections:

A- Coronary artery disease: contains (7) questions (multiple choice questions)

B- Cardiac Catheterization procedure: contains (20) questions (yes or no questions)

C- Recovery and follow-up when you get home: contains (7) questions (yes or no questions)

A questionnaire was prepared for patients admitted to undergo elective coronary angiography (CAG), the questionnaire used in this study was developed by the researcher obtained from the literature review. Each knowledge assessment questions was given weighted marks based on the appropriateness of that intervention for that particular condition, the researchers were used two point scales to measure each question of the knowledge sheet: (0) for wrong answer and (1) for right answer. Validity of questionnaires determined through panels of experts and reliability of the questionnaires was determined by internal consistency through calculating Cronbach s’ Coefficient alpha = 78.

**Scoring system:** each right answer was given one degree. The total scores were 100%. Those who obtained less than 25% were considered having poor level (low low). While those who less than 50% were considered having (low high) level and more than 50% were considered having (high low) of knowledge. And finally; those who have 100% or less were considered having (high high) of knowledge.

Score of responses is categorized according to the following:

High high = (75-100):4

High low= (50-74):3

Low high= (25-49):2

Low low= (0-24):1

**Statistical analysis:**

SPSS 20.0 was used for statistical analysis: Descriptive data analysis was done through (frequency,
percentage, mean of score, standard deviation, Chi-Square test and Mann–Whitney U test).

**RESULTS AND DISCUSSION**

Table -1- presented the socio demographic characteristics. There were 79(65.8%) was male, concerning age, Mean age of the participants was (55.6) years within the age group (54 - 58). In relation to marital status 115(95.8%) were married. The most common educational level is primary school graduate of 77(64.2%). Concerning occupation are the self-employee 42 (35%). Regarding to the Sources of information about coronary catheterization the majority of sample 88(73.3%) were no source; Concerning smoking: the most common are smoking which were 63(52.5%).

Table -2- displays the frequency that counts for clinical characteristics variables; most patients haven’t diabetic mellitus that is 89 (74.2%). and 85(70.8%) having hypertension. Concerning family history 51(42.5%) having family history of coronary artery disease. Regarding duration of symptoms before cardiac catheterization most patients were 63(52.5%) having symptoms before cardiac catheterization within the period between (1–6) month.

Table -3- displays the degree and frequency of patient’s knowledge; regarding to the coronary artery disease knowledge scale most patients 73 (60.8%) have score range low high (25-49) and mean of score (0.30). Concerning cardiac catheterization procedure knowledge scale the most common 86 (71.7) have score range low high (25-49) and mean of score (0.39). In relation to recovery and follow-up when you get home knowledge scale most patients 57 (47.5%) has score range low high (25-49) and mean of score (0.38). Finally, Overall Main Domains knowledge scale most patients 102 (85%) has score range low high (25-49) and mean of score (0.37).

The data in table (4) depicts that there was no significant association between the Patient’s knowledge vs gender and Patient’s knowledge vs smoking. The current study is effort to assess the demographic characteristics, clinical characteristics, assess the knowledge regarding coronary catheterization among patients undergoing to this procedure and find association between patient’s knowledge with their demographic characteristics. All included patients (N=120) were undergoing to coronary catheterization.

**Assess the demographic characteristics**

Patients involved in this study, with high percentage are males 79 (65.8%); the mean age of patients in this study is (55.6). Marital status in study is 118(98.3%) of patients married. The Education levels, in this study, show that most of the patients of 77(64.2%) are at primary school. Most patients 88 (73.3%) do not have any source of information about cardiac catheterization. As to smoking it show that 63 (52.5%) show smoking.

**Assess the clinical characteristics**

Hypertension disease in patients show that 85 (70.8%) have hypertension. Diabetic mellitus disease in patients show that 31 (25.8%) are these have diabetic disease. Regarding family history of coronary artery disease, 51(42.5%) does have family history. (Table -2-)

**Assess the knowledge regarding coronary catheterization**

This study confirms that patients undergoing coronary angiography have relatively low knowledge levels overall about the procedure. Previous studies demonstrated that in patients undergoing coronary angiography has low knowledge about this procedure; study was done in Turkey showed a significant low knowledge levels and lack of awareness among patients undergoing coronary angiogram for the first time.

**Association between patient’s knowledge with their demographic characteristics**

This study shows there was no significant association between the patient’s knowledge with their demographic characteristics, chronic illness and their family history. The researcher confirms that knowledge about coronary catheterization should be provided to patients as a whole regardless of their sex, age, educational level, social status, occupation, have diabetes or hypertension.
Table 1- Distribution of Patients According to the Demographic data of the sample (n= 120)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Groups</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>79</td>
<td></td>
<td>65.8</td>
</tr>
<tr>
<td>Female</td>
<td>41</td>
<td></td>
<td>34.2</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34-38</td>
<td>3</td>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td>39-43</td>
<td>4</td>
<td></td>
<td>3.3</td>
</tr>
<tr>
<td>44-48</td>
<td>20</td>
<td></td>
<td>16.7</td>
</tr>
<tr>
<td>49-53</td>
<td>25</td>
<td></td>
<td>20.8</td>
</tr>
<tr>
<td>54-58</td>
<td>26</td>
<td></td>
<td>21.7</td>
</tr>
<tr>
<td>59-63</td>
<td>16</td>
<td></td>
<td>13.3</td>
</tr>
<tr>
<td>64-68</td>
<td>17</td>
<td></td>
<td>14.2</td>
</tr>
<tr>
<td>69-73</td>
<td>4</td>
<td></td>
<td>3.3</td>
</tr>
<tr>
<td>74-78</td>
<td>5</td>
<td></td>
<td>4.2</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>118</td>
<td></td>
<td>98.3</td>
</tr>
<tr>
<td>Widowed</td>
<td>1</td>
<td></td>
<td>0.8</td>
</tr>
<tr>
<td>Divorced</td>
<td>1</td>
<td></td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Level of Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>77</td>
<td></td>
<td>64.2</td>
</tr>
<tr>
<td>Intermediate school</td>
<td>9</td>
<td></td>
<td>7.5</td>
</tr>
<tr>
<td>Secondary school</td>
<td>12</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>University graduate</td>
<td>22</td>
<td></td>
<td>18.3</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wife house</td>
<td>37</td>
<td></td>
<td>30.8</td>
</tr>
<tr>
<td>Retired</td>
<td>13</td>
<td></td>
<td>10.8</td>
</tr>
<tr>
<td>self- employee</td>
<td>42</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Employee</td>
<td>23</td>
<td></td>
<td>19.2</td>
</tr>
<tr>
<td>Soldier</td>
<td>5</td>
<td></td>
<td>4.2</td>
</tr>
<tr>
<td><strong>Sources of information about cardiac catheterization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Internet</td>
<td>5</td>
<td></td>
<td>4.2</td>
</tr>
<tr>
<td>Articles and Newspaper</td>
<td>1</td>
<td></td>
<td>0.8</td>
</tr>
<tr>
<td>Family and relatives</td>
<td>4</td>
<td></td>
<td>3.3</td>
</tr>
<tr>
<td>Doctors and nurses</td>
<td>22</td>
<td></td>
<td>18.3</td>
</tr>
<tr>
<td>No source</td>
<td>88</td>
<td></td>
<td>73.3</td>
</tr>
<tr>
<td><strong>Smoking</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>63</td>
<td></td>
<td>52.5</td>
</tr>
<tr>
<td>No</td>
<td>57</td>
<td></td>
<td>47.5</td>
</tr>
</tbody>
</table>
### Table -2 - Distribution of the patients According to chronic illness and their Family History

<table>
<thead>
<tr>
<th>Variable</th>
<th>Groups</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Mellitus</td>
<td>Yes</td>
<td>31</td>
<td>25.8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>89</td>
<td>74.2</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Yes</td>
<td>85</td>
<td>70.8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>35</td>
<td>29.2</td>
</tr>
<tr>
<td>Family history of coronary artery disease</td>
<td>Yes</td>
<td>51</td>
<td>42.5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>69</td>
<td>57.5</td>
</tr>
<tr>
<td>Duration of heart disease</td>
<td>&lt;1</td>
<td>39</td>
<td>32.5</td>
</tr>
<tr>
<td></td>
<td>1–6</td>
<td>63</td>
<td>52.5</td>
</tr>
<tr>
<td></td>
<td>7–12</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>&gt;12</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table -3- Distribution of the Patients According to knowledge Scale

<table>
<thead>
<tr>
<th>Main Domains</th>
<th>Score range</th>
<th>Number of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronary artery disease</td>
<td>High high*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>High low*</td>
<td>14</td>
<td>11.7</td>
</tr>
<tr>
<td></td>
<td>Low high*</td>
<td>73</td>
<td>60.8</td>
</tr>
<tr>
<td></td>
<td>Low low*</td>
<td>33</td>
<td>27.5</td>
</tr>
<tr>
<td></td>
<td>total</td>
<td>120</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.30 0.461</td>
</tr>
<tr>
<td>Cardiac Catheterization procedure</td>
<td>High high*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>High low*</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Low high*</td>
<td>86</td>
<td>71.7</td>
</tr>
<tr>
<td></td>
<td>Low low*</td>
<td>10</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>total</td>
<td>120</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.39 0.489</td>
</tr>
<tr>
<td>Recovery and follow-up when you get home</td>
<td>High high*</td>
<td>10</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>High low*</td>
<td>23</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>Low high*</td>
<td>57</td>
<td>47.5</td>
</tr>
<tr>
<td></td>
<td>Low low*</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>total</td>
<td>120</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.38 0.486</td>
</tr>
<tr>
<td>Overall Main Domains</td>
<td>High high*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>High low*</td>
<td>9</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>Low high*</td>
<td>102</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Low low*</td>
<td>9</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>total</td>
<td>120</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.37 0.484</td>
</tr>
</tbody>
</table>
Table (4): Correlation between knowledge and (gender, smoking).

<table>
<thead>
<tr>
<th>Ranks</th>
<th>gender</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
<th>Mann-Whitney U</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s knowledge</td>
<td>male</td>
<td>79</td>
<td>59.27</td>
<td>4682.00</td>
<td>1522.000</td>
<td>0.520</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>41</td>
<td>62.88</td>
<td>2578.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>smoking</td>
<td>yes</td>
<td>63</td>
<td>59.90</td>
<td>3774.00</td>
<td>1758.000</td>
<td>0.814</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>57</td>
<td>61.16</td>
<td>3486.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (5): Correlation between knowledge and selected Demographic Characteristics.

<table>
<thead>
<tr>
<th>Ranks</th>
<th>age</th>
<th>N</th>
<th>Mean Rank</th>
<th>Chi-Square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s knowledge</td>
<td>34-38</td>
<td>3</td>
<td>38.00</td>
<td>5.674</td>
<td>8</td>
<td>0.684</td>
</tr>
<tr>
<td></td>
<td>39-43</td>
<td>4</td>
<td>53.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>44-48</td>
<td>20</td>
<td>59.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>49-53</td>
<td>25</td>
<td>57.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>54-58</td>
<td>26</td>
<td>70.31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>59-63</td>
<td>16</td>
<td>60.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>64-68</td>
<td>17</td>
<td>59.18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>69-73</td>
<td>4</td>
<td>53.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>74-78</td>
<td>5</td>
<td>62.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>married</td>
<td>118</td>
<td>60.88</td>
<td>1.210</td>
<td>2</td>
<td>0.546</td>
</tr>
<tr>
<td>Patient’s knowledge</td>
<td>divorced</td>
<td>1</td>
<td>38.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>widowed</td>
<td>1</td>
<td>38.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>total</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of education</td>
<td>Primary school</td>
<td>77</td>
<td>59.82</td>
<td>0.914</td>
<td>3</td>
<td>0.822</td>
</tr>
<tr>
<td>Patient’s knowledge</td>
<td>Intermediate school</td>
<td>9</td>
<td>58.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Institute graduate</td>
<td>12</td>
<td>68.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>University graduate</td>
<td>22</td>
<td>59.82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table (6): Correlation between knowledge and chronic illness and their Family History.

<table>
<thead>
<tr>
<th>Ranks</th>
<th>gender</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
<th>Mann-Whitney U</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s knowledge</td>
<td>Diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>31</td>
<td>59.29</td>
<td>1838.00</td>
<td>1342.000</td>
<td>0.789</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>89</td>
<td>60.92</td>
<td>5422.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>Yes</td>
<td>85</td>
<td>60.59</td>
<td>5150.00</td>
<td>1480.000</td>
<td>0.959</td>
</tr>
<tr>
<td>No</td>
<td>35</td>
<td>60.29</td>
<td>2110.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family history</td>
<td>yes</td>
<td>51</td>
<td>62.71</td>
<td>3198.00</td>
<td>1647.000</td>
<td>0.476</td>
</tr>
<tr>
<td>no</td>
<td>69</td>
<td>58.87</td>
<td>4062.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONCLUSION**

Lack of information about the coronary catheterization among patients in Iraqi center for heart diseases. Knowledge about coronary catheterization should be provided to patients as a whole regardless of their sex, age, educational level, social status, occupation, have diabetes or hypertension.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Baghdad/ university health, Baghdad / Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**

Effectiveness of an Education Program on Knowledge of Caregivers about Psychosocial Problems for Clients with Epilepsy

Saja M. Hashem¹, Haider A. Jabor²

¹Psychiatric Nursing, College of Nursing, University of Babylon, Iraq, ²Psychiatric Nursing, College of Nursing, University of AL- Qadisiyah, Iraq

ABSTRACT

The aim of this study is to measure the effectiveness of an educational program on knowledge of caregivers about psychosocial problems of patients with epilepsy. A quasi-experimental design is carried out throughout the application of test–retest approach of pre-test, post test 1 and post test II for the study and control groups from 3rd June to 16th Sep. 2018. A purposive (non-probability) sample of (26) caregiver’s of patient with epilepsy as a study group and (30) as a control group. The data was collected through the use of unstructured interview by using questionnaire, consist of 1- covering letters to obtain the agreements of caregivers, 2- demographic information (Socio-demographic characteristics. this part consists of (10) items about caregivers and (4) items about patients, 3- include three domains: 1- Questions about epilepsy, 2- Psychological problems, 3- Social problems. Content validity of the questionnaire is determined through the panel of (15) experts. The findings of the present study reveals that the changing in the knowledge of caregivers over time is very high (0.50). also the change of knowledge between the study and control group in per, post and post 2 test is effect (0.30).

Keywords: Epilepsy, Caregivers

INTRODUCTION

Epilepsy and psychiatric disorder are closely associated that occurs as a result of the complication of epilepsy. variety patterns of co-morbidities of depression, anxiety and cognitive impairment can occur within different epilepsy syndromes. It can be related with the location of the epileptic. The most of patients with epilepsy have problems with communication. they also have high occurrence of suicidal attempts or ideation, the incidence of suicide in patients with epilepsy is about four times more frequent than healthy individuals, the depression is considered a most common causes for suicidal ideation in patients with epilepsy and psychiatric symptoms. Male clients with temporal lobe epilepsy have higher risk for suicidal behavior. Epilepsy has physical, psychological and social impact on epileptic patients not only on the individuals with epilepsy, but also on their family and indirect on the community, physical injury result from sudden occurs of the seizures. Caregivers have an important role in the physical and emotional health of the patients with epilepsy. Often the caregiver is a relative’s member or a person who has a closely personal association with the patients. Sometimes the role of the caregiver is to provide the essential connection between the patients and health care professionals. A caregiver’s role involves knowledge, patience, and compassion (Edmonton Epilepsy Association, 2011). Caregivers understanding patient’s problems can lead to a good progress in intervention and reaching the goal in controlling these problems that are more likely improve quality of their life. Knowledge of caregiver’s is an very important means because this knowledge will help them to cope with their child’s epilepsy. Higher level of knowledge is associated with less restrictions in family behavior toward their child, less parents worries, and less perceived stigmatization and isolation, knowledge

Corresponding author:
Saja M. Hashem
Psychiatric Nursing, College of Nursing, University of Babylon, Iraq
gaps are common in parents.

**METHODOLOGY**

A quasi-experimental design is carried out through the present study with the application of test–retest approach (pre- test, post test1 and post test II for the study and control groups) from 3rd June to 16th Sep. 2018. The study was conducted on caregivers of patients with epilepsy to measure the effectiveness of an educational program on knowledge of caregivers about psychosocial problems. A purposive (non- probability) sample of (26) caregiver’s of patient with epilepsy as a study group and (30) as a control group. Data was collected through the use of unstructured interview a questionnaire. The questionnaire items constructed by the researcher depending on extensive review of related books and available literature. This consist of three major parts as follows:

- **covering letters to obtain the agreements of caregivers,**
- **Demographic information :** Socio-demographic characteristics. this part consists of (10) items about caregivers and (4) items about patients,
  - Questions about epilepsy,
  - Psychological problems
  - Social problems.

The total items of the instrument are (50) items for measures the knowledge of caregiver’s of patients with epilepsy. total score is 50 if all the items are correct and take zero (0) if all the items are incorrect. Cut of point is 25 every person will take 25 and above that means he has knowledge about psychosocial problems of epilepsy. Content validity of the questionnaire is determined through the panel of (15) experts. From different specialties related to the field of the study. reliability of the questionnaire was used to determine the internal consistency through the calculated by using: Alpha Cronbach conducted on (10) caregivers selected from the specialized neurological center in Al- Dewanyia teaching hospital were excluded from the original sample. The study is conducted at the specialized neurological center in Al- Dewanyia teaching hospital. on caregiver’s of patients with epilepsy who were attending this center to treatment and to receive medication. educational program is implemented throughout seventh sessions on the psychological and social problems of epilepsy. each session take 45 minutes, all sessions are presented in outpatient specialized neurological center in Al-Dewanyia teaching hospital, the time of all lectures are presented to the caregiver’s of patients (study group) at 9 o’clock in morning. two lecture in each week at Saturday and Tuesday. Data are analyzed through the use of SPSS (Statistical Process for Social Sciences) version 20.0 application Statistical analysis system and Excel.

**RESULTS AND DISCUSION**

The finding of the table indicated that the most of the caregivers (35%) of the study group at 31-35 years old and the most of the caregivers (53.3%) among the control group at 31-35 years old. Both of the study and control groups at the same age group, this result refer to that the researcher control on their age groups. Table 2 represent the significant comparison in pre test between study group and control group regard to knowledge of caregivers about psychosocial problems of patients with epilepsy, the results reveals that no significance differences between study group and control group in aspect of knowledge, epilepsy disorder (t= 0.80), depression disorder (t=0.98), anxiety disorder (t=1.80), suicide (t=1.14), attention deficit and hyperactivity disorder (t=1.69), sleep problems (t=0.62), stigma of epilepsy (t=0.47), school problems (t=1.8) and social relationship (t=2.0). at P<0.05 Table (3) shows the significant comparison in post test between study group and control group in regard to knowledge of caregivers about psychosocial problems of patients with epilepsy, the results reveals that highly significant different at P<0.05 between the study group and control group in aspect of knowledge, epilepsy disorder (t= 3.3), depression disorder (t= 5), anxiety disorder (t= 3.5), suicide (t= 3.4), attention deficit and hyperactivity disorder (t= 2.6), sleep problems (t= 5.6), stigma of epilepsy (t= 3), school problems (t= 5.5) and social relationship (t= 4.4). Table (4) shows that the results of Multiple Comparison (LSD) technique, among all repeated measurement for the study sample at pre, post-1 and post-2 periods, which indicating that knowledge of caregivers about psychosocial problems had reported highly significant different at P<0.00 between the initial period of pre time and post 1 period, then followed with highly significant different at P<0.00 between the initial period of pre time and post 2 period. Then followed
with reported highly significant different at P<0.00 between the post 1 period and initial period of pre time and no significant different at P<0.05 between the post 1 period and post 2 period. reported highly significant different at P<0.00 between the post 2 periods and initial period of pre time and no significant different at P<0.05 between the post2 period and post 1 period at P<0.05. Table (5): the result of this table reveals that the changing in the knowledge of caregivers over time is very high (0.50) . also the change of knowledge between the study and control group in per, post and post 2 test is effect (0.30) and also within groups is effect (0.21). The results of this study shows that the most of the caregivers (35%) are between 31-35 years old of the study group and (53.3%) of the caregivers among the control group this study agree with Mahmoud and Abd Elaziz (2015). They found the mean age of parent caregivers was 34 years old. This result indicate that the caregivers in this age are mature enough than other age group to provide care for their children. Through the data analysis of the study, in pre-test between study and control. it has been emerged in the table (table 2), had no significant difference between study and control group about their knowledge , this result present that all of the caregivers have been equally in their knowledge about psychosocial problems of epilepsy, this is coming with the status of the parents and their patients with epilepsy because both of them not attending to education program about epilepsy and its effect on normal child life. In the comparative between the study and control group in regard to post test I, the result of the data analysis have indicated that their knowledge of caregivers (study group) about psychological and social problems among patients with epilepsy have been enhanced as a result of the implementation of education program (Table 3 and table 4). So their responses have been improvement directly post the researcher completed of the education program in the center. The result of the present study are supported by the study of Sharma et al., (2013) they found significant differences between the pre-test and post-test knowledge of epilepsy among teachers who attended to education program on epilepsy, so the study of the Hagemann et al. (2016) they were found parents group have significantly improvement in epilepsy-specific knowledge compared with the control group also all of the participants (parents) related to program as very good (71%).

Table 1. Distribution of the study and control groups according to their age groups.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Study Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
</tr>
<tr>
<td>20---------25</td>
<td>3</td>
<td>11%</td>
</tr>
<tr>
<td>26---------30</td>
<td>8</td>
<td>31%</td>
</tr>
<tr>
<td>31---------35</td>
<td>9</td>
<td>35%</td>
</tr>
<tr>
<td>36---------40</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>41---------45</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 2. Comparison between the study and control group in regard to their pre-test.

<table>
<thead>
<tr>
<th>Aspect of knowledge</th>
<th>Study group</th>
<th>Control group</th>
<th>T. test</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>Epilepsy disorder</td>
<td>10</td>
<td>4.5</td>
<td>12.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Depression disorder</td>
<td>12.0</td>
<td>3.1</td>
<td>9.0</td>
<td>2.8</td>
</tr>
<tr>
<td>Anxiety disorder</td>
<td>5.9</td>
<td>2.3</td>
<td>7.9</td>
<td>2.6</td>
</tr>
</tbody>
</table>
### Table 3. Comparison between the study and control group in regard to post test I.

<table>
<thead>
<tr>
<th>Aspect of knowledge</th>
<th>Study group</th>
<th>Control group</th>
<th>T. test</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>Epilepsy disorder</td>
<td>16</td>
<td>2.0</td>
<td>11.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Depression disorder</td>
<td>17</td>
<td>3.5</td>
<td>11.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Anxiety disorder</td>
<td>15</td>
<td>4.9</td>
<td>9</td>
<td>2.0</td>
</tr>
<tr>
<td>Suicide disorder</td>
<td>12</td>
<td>1.8</td>
<td>7</td>
<td>2.0</td>
</tr>
<tr>
<td>Attention deficit and hyperactivity disorder</td>
<td>11</td>
<td>1.1</td>
<td>7</td>
<td>0.5</td>
</tr>
<tr>
<td>Sleep problems</td>
<td>12</td>
<td>0.7</td>
<td>9</td>
<td>0.7</td>
</tr>
<tr>
<td>Stigma of epilepsy</td>
<td>14</td>
<td>2.1</td>
<td>10</td>
<td>1.4</td>
</tr>
<tr>
<td>School problems</td>
<td>17</td>
<td>2.3</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Social relationship</td>
<td>14</td>
<td>2.1</td>
<td>7</td>
<td>0.7</td>
</tr>
</tbody>
</table>

---

### Table 4. Multiple Comparison among study group in regard to pre, post-1 and post-2 test by using Post hoc test (LSD).

<table>
<thead>
<tr>
<th>(I) Knowledge of Caregivers</th>
<th>(J) Knowledge of Caregivers</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post I</td>
<td></td>
<td>-11.46154</td>
<td>1.40062</td>
<td>.000</td>
</tr>
<tr>
<td>Post II</td>
<td></td>
<td>-9.73077</td>
<td>1.40062</td>
<td>.000</td>
</tr>
<tr>
<td>Post I</td>
<td>Pre</td>
<td>11.46154</td>
<td>1.40062</td>
<td>.000</td>
</tr>
<tr>
<td>Post II</td>
<td>Pre</td>
<td>1.73077</td>
<td>1.40062</td>
<td>.220</td>
</tr>
<tr>
<td>Post II</td>
<td>Pre</td>
<td>9.73077</td>
<td>1.40062</td>
<td>.000</td>
</tr>
<tr>
<td>Post II</td>
<td>Post I</td>
<td>-1.73077</td>
<td>1.40062</td>
<td>.220</td>
</tr>
</tbody>
</table>

---
Table 5. Repeated Measures ANOVA test for knowledge of caregivers about psychosocial problems of epilepsy.

<table>
<thead>
<tr>
<th>Knowledge of Caregivers</th>
<th>F</th>
<th>Sig.</th>
<th>Size of effect (Partial Eta Squared)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Effect</td>
<td>27</td>
<td>0.00</td>
<td>0.50</td>
</tr>
<tr>
<td>Between groups</td>
<td>21</td>
<td>0.00</td>
<td>0.30</td>
</tr>
<tr>
<td>Within groups</td>
<td>14</td>
<td>0.00</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Figure (1) the figure shows that the changing in the knowledge of caregivers in regard to pre, post 1 and post 2.

CONCLUSION

Most of the caregivers were mid-age, females, living in urban area and have secondary level of education.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Psychiatric Nursing, College of Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

Effectiveness of an Educational Program in the Development of Scientific Thinking among Undergraduate Students in General Teaching Methods

Mushriq Mohammed Mojawal¹, Shaimaa Hassan Abdul Hadi²
¹Faculty of Basic Education / Babylon University, Iraq, ²Department of Planning and Studies / Al Qassim Green University, Iraq

ABSTRACT

The current research aims to identify the effectiveness of an educational program in the development of mental thinking among undergraduate students in general teaching methods, to investigate the research objective, the researchers hypothesized the following zero hypothesis: There was no statistically significant difference at significance level (0.05) between the average grade of the experimental group students who study according to the educational program and the average grade of students in the control group who study according to the usual method in the scientific thinking developing test, to achieve this, the researchers chose an experimental design with partial control, the College of Basic Education at the University of Babylon was intentionally selected for the experiment, the sample consisted of 50 female and male students, 25 students in the experimental group and 25 students in the control group, the researcher taught the experimental group in the educational program and taught the control group in the usual way. The results were then analyzed and showed that the students of the experimental group who studied on the basis of an educational program were superior to the control group who studied in the usual method.

Keywords: Effectiveness, educational program, development, scientific thinking, undergraduate students, general teaching methods.

INTRODUCTION

The mind differs from the brain that the mind can only be attained by having four elements which are (senses, tangible reality, previous information, and the brain), where the brain is the center of the nervous system in humans and animals, it controls all the body’s organs through many functions. The hemispheres of the brain consist of two equal halves left and right half, these halves are tightly bound by nerve fibers known as (Corpus Callosum). This overlap between the hemispheres allows each side of the brain to exchange information freely. Both halves (left and right) control the movements of the human being in reverse, in other words, the right half is responsible for the organs on the left side of the human body and vice versa. Each part of the brain is responsible for handling certain activities, the right half is responsible for: harmony, colors, imagination, daydream, dimensions, understanding spaces, music, and other similar activities. While the left half is responsible for the following: logic, lists, lines, words, numbers, sequence, analysis, and other similar activities. The brain is a smooth texture gelatic body that makes up 78% of water, 10% fat, 8% protein and 4% other ingredients, it consists of cells similar to other organs of the body, these cells are divided into two parts: First: Neurons are the ones that perform the processes of thinking and learning and called neuron or nerve cell, which are responsible for thought processes in the brain and make up 10% of brain cells located in the upper cerebral cortex, which are consisted of 100 billion neurons in the adult human, the one neuron consists of three parts: neural body, dendrites, and axon. Second: Neuroglia which is the most types in number and it’s percentage about 90% of the brain cells, it nurtures the neurons, and provide an appropriate medium for the...
neurons movement and their transition in the embryo stage, which helps in shaping fetus brain. Thinking is a process in which the mind organizes its experiences in a new way through dynamic mental activities, and mental processing of formulas and contents, using symbols such as mental images, meanings, words, numbers, signs, and expressions when solving a particular problem so that this process includes the recognition of new relationships between two or more subjects or elements of the situation to be resolved. In explaining the mechanism of the mind, Debono states that the brain organizes the information it receives through the senses in a self-regulating way, where the brain works to shape patterns and look for them later. The pattern is the organized configuration of the neurons that make up the brain or the organization of information on the surface of the memory. The concept of mental thinking developing is one of the modern concepts that have emerged in the past two decades and the researchers and psychologists center of interest by considering it a factor affecting the educational process whether in university education or before, because their knowledge of the thinking methods favored by university students helps to determine the appropriate way to teach them, and to determine the appropriate means to evaluate them, which leads to higher educational achievement and improve the educational process. Recently there have been many complaints from the mainstream education system and its programs in many parts of the world, and the increasing criticisms towards the educational institutions and accusing them of failing to teach students and how to deliver the material to their brains. Despite the efforts of the institutions and the quantitative and qualitative transformations, their curricula, activities and teaching methods are still relatively deficient in the development of the correct thinking methods of our students, as its curricula and methods of evaluation still depend on conservation and indoctrination. The learner remains the negative role in the educational process, only to receive the courses imposed on him and must accept everything that is presented without criticism or research. As well as that there are factors hindering the student thinking, including excessive self-confidence, fatigue, physical and mental fatigue, organizing things before starting the process of thinking, and careful in the conclusion of important ideas and rely on multiple sources to document the news. The present educational reality also witnessed its dependence on conservation and memorization only without developing the ability to think and creativity, which is the basis of the nation’s progress, as well as that the methods of modern global evaluation has become including cumulative questions based on thinking and not on conservation and memorization hence the need to find ways to help to achieve the desired educational goals. Education in the field of teaching aims to provide service to the student and to the teacher. Its objective is to develop the student’s abilities revealing his energies and potentials to take his role in the society and create in him the ability to continue learning. While it’s objective to the teacher is to help him guide students in an educational situation to change his behavior patterns to get the required skills. The university professor skill and his proficiency in creating the appropriate teaching environment for learning is measured by his ability to develop motivation among students and to stimulate their thinking in all kinds, in addition to strengthening the social relations between the students themselves and between students and their teachers and to do their best abilities and sharpen their aspirations for the distinguished scientific achievement in which it will reflect on the level of their giving and the extent of positive interaction. Knowledge of thinking methods is one of the characteristics of a successful teacher. It occupies an important position because it is one of the subjects that are closely related to the changes in the age in which we live and interact and it is witnessing a tremendous development in scientific and technological progress. The current research aims to identify the effectiveness of the educational program in developing practical thinking among undergraduate students in general teaching methods.

**METHODOLOGY**

**First: Experimental Design:** The experimental design is a chart that helps in the conduct of research procedures and provides a guarantee for the possibility of overcoming the difficulties that appear in the statistical analysis. The researchers adopted the experimental design of the control group with the prior and post-test.

**Research Population**

The characterization of the community and its sample is essential in empirical research because the researcher’s description of the group or the individuals to whom the research results apply prior to its implementation provides for the observance of external safety conditions...
and thus has the opportunity to ensure the dissemination of research findings to the original community (Al Zobaie and Mohammed, 1981: 99), the current research sample consisted of a group of 50 students, 25 students, of the experimental group was studied by the educational program, and the control group was studied by the usual method, the researchers excluded the students who failed in the subject of the experiment, which are two from the control group because they have previous educational experience, which affects the accuracy of the results and the exclusion of the results only with the retention of students in their class in order to maintain the academic and educational system.

Parity of research groups:

The researchers were intent to achieve parity between the two groups in terms of gender and age, calculated in terms of months and the educational achievement of each of the parents and the purpose of that was obtaining correct, objective, and accurate results away from other factors that may affect the operation and safety of the experiment.

Control of the Internal Variables:

The specialists of educational and psychological sciences emphasize the difficulties facing them in isolating the variables of the phenomena they are studying or controlling because behavioral phenomena are complex non-physical phenomena in which different factors overlap in it (Humam and Sein, 1984: 203-204), one of the variables that the researchers sought to control is: accompanied accidents, maturity factor, experimental exhaustion, test factor, measurement tool and impact of experimental procedures.

Formation of Behavioral Objectives:

Behavioral Objective is a written statement describing the expected performance of the learner after completing the teaching of one educational unit, ie, it describes the learning outcome and the final behavior of the learner rather than the means used to achieve this behavior (Al Heillah, 2003: 44), The researchers examined the behavioral objectives prescribed for the general teaching methods and after making the necessary modifications to some of them in light of their presentation to a group of experts, have been adopted in the experiment.

Preparation of Instructional Plans:

Planning is the process by which information is collected, categorized, organized, and relevant information is compiled from several sources to design educational experiences that help learners to achieve the objectives of the curriculum and take into consideration the general goals and special goals and the philosophical, psychological and social foundations (Abd Ali and Aboud, 2012: 33).

Since the teaching process can only proceed successfully with the pre-planning of the lesson, the researchers prepared instructional plans in light of the behavioral goals of each subject of the general teaching methods and in light of what is required by the educational program. The instructional plans were presented to a group of experts, taking their observations and opinions about the validity of it.

Research Tool (Collective Test):

Is a set of paragraphs or questions prepared by the teacher and given to the students to know their understanding of the subject, tests are very important to measure and evaluate the students’ learning and progress and evaluate the educational materials used by the teacher as well as to evaluate the method of education that followed (Jamaa, 2010: 175-180). The researchers preferred the objective tests because they are characterized by a high degree of honesty and consistency, as well as that the answers of the students are not affected by the teacher’s self-personal impact and are not affected by the language abilities of the students, the researchers presented the prepared collective test to a group of experts to obtain scientific accuracy in it.

The Educational Program: Defined as:

A set of organizational and planned activities aimed to develop the knowledge, experiences, and trends of trainees and helping them to update their information, raise their competencies, solve their problems and improve their performance. The researchers prepared an educational program that included a set of activities, instructional plans, and strategies, which was based on the progress of the experiment and its success and was presented to a group of experts to determine the validity of the application to apply to the experimental group correctly.
Statistical Methods:

The researchers used the t-test for two independent samples, the effectiveness of the wrong alternatives, Pearson correlation, item discrimination strength equation, item difficulty equation, Cronbach’s alpha equation, and one-way ANOVA analysis for variation.

RESULTS AND DISCUSSION

The results showed that the experimental group was superior to the control group and achieved the objective of the research. There is no statistically significant difference at level 0.5 between the mean average grades of the experimental group who are studying using the educational program and the mean average grades of the control group students who study in the usual way in the post-test in the general teaching methods, the reason for this is as follows: the educational program designed to transfer students from the usual pattern, which is often the answer to the teacher’s questions to a new style based on the participation in the educational process through the involvement of students in activities, which are often characterized as a survey and emphasizes the actual intellectual participation in the activity and in turn, there is a meaningful learning based on understanding, Zayton pointed out that the experiences and (educational learning) scientific activities provided by the teacher works to stimulate and awaken the motivation to learn for the students on the one hand and keeping them on the other hand and it is done through the thinking scientific activities, research, investigation and discovery, which raise minds and stimulate them to ask questions and research (Zayton, 2001: 329).

CONCLUSION

The researchers concluded that the use of the educational program led to the formation of a positive effect in the achievement of students in the general teaching methods as well as motivate them to use scientific thinking to reach the understanding of the subject.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Basic Education / Babylon University, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

1. Elfein B. The relationship between scientific skill levels among secondary school students by age, gender, academic year and number of courses studied by students, unpublished MSc. thesis. 1980.
5. Al-Demerdash AS. Modern Curricula, Kuwait, Kuwait University. 1996.
15. Attiah MA. Thinking, its types, skills, and learning
strategies, Dar Al Safaa for publishing and distribution, Jordan. 2015.


21. Al Melakh HK. Scientific thinking in Arabic grammar, extrapolation, analysis, and interpretation, Dar Al Shorouq for publishing and distribution, Jordan. 2002

22. Al Mansoor G. Thinking Methods and their relation to problem-solving, a field study on a sample of the sixth-grade students in the schools of Damascus, Syria, University of Damascus Journal. 2007; 23.


24. Hashim RM. Skills of thinking and intuitive speed, and training packages on them, 1st floor, Dar Haneen for printing and publishing, Jordan. 2006.


Effectiveness of Structured Teaching Program upon Midwives’ Knowledge Concerning Progress of Labor in Al-Hilla Hospitals

Fawziya M. Nattah1, Amean A. AL-Yasir2, Muna A. Khaleel3

1Maternal and Neonatal Nursing, College of nursing, University of Babylon, Al-Hilla City, Iraq,
2Community Health Nursing Department, College of Nursing, University of Babylon, Al-Hilla City, Iraq

ABSTRACT

To prevent the complications during the labor to the mother and the fetus, there should be an active monitoring of the mother as well as fetus during first stage. 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. A quasi-experimental design was carried out throughout the present study during September 26th 2017 to December 20th 2018. It aimed to assess the knowledge of midwives concerning nursing intervention during the first stage of labor for both groups (study and control) throughout an initial assessment. A Non-probability (purposive) sample were selected consisted of (50) nurse midwives who are working in the delivery rooms of Babylon Teaching Hospitals for Maternity and pediatric who attended the teaching program as the study group of (25) midwives and the other group of (25) midwives who were employed in the Al-Hilla General Teaching Hospital who did not attend the teaching program and considered as a control group. The study results revealed that the assessment of nurse midwives’ knowledge improved by related items after the implementation of the structured teaching program.

Keywords: Effectiveness, Teaching program, Midwives’, Knowledge, Progress of labor.

INTRODUCTION

High maternal mortality is a serious public health dilemma in developing countries. Reduction in maternal fetal morbidity and mortality as it is one of the Millennium Development Goals to be adapted by the international community’s composed of over 42 countries. Further reduction in maternal mortality is likely to be contingent on the continued strengthening of health systems and improving the knowledge and the capacity of women to maintain their health. Childbirth is considered a life-changing event as its life-changing time for a mother and her whole family. These moments are so precious, and so important is for most women and families all over the world, but childbirth is also associated with great risks, and in severe cases, disability and even death for mother or child. Early identification of complications helps a long way in reducing maternal fetal morbidity and mortality. 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. Midwives are responsible to provide care and support for laboring mothers in complicated and non-complicated deliveries. So we need to teach nurse midwife about alternative therapies to help laboring mothers to cope with labor pain. Nurse midwives play a vital role during labor and delivery by providing necessary nursing interventions for laboring women.

MATERIALS AND METHOD

The study aims to assess the knowledge of midwives concerning progress of labor during first stage of labor for both groups (study and control) throughout an initial assessment.

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.

Sample of the Study A Non-probability (purposive) sample was selected consisted of (50) nurse midwives who are working in the delivery rooms of 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 of 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 the 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 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 the knowledge.

Data Analysis Data were entered, managed and analyzed by using 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

Table 1- The result of the present study demonstrates the baseline (before education program) characteristics of the studied groups where no statistically significant differences had been found between both groups in age (P. > 0.05). In which the highest percentage of nurses’ midwives (44%) in the study group were belong to age groups (21-30) years, while in the control group the highest percentage of nurses’ midwives (40%) were belong to same age groups. That means the highest percentages of the nurse midwives’ under study were within the ideal and the productive age group. Besides, the present study results agreed with the results of (10) study (2015) which revealed that a higher percentage of midwives (40 %) their ages ≥ 30 years old, while the lowest percentage (24%) for the age group (25-29) years. Regarding the marital status, results of this study showed that the highest percentages (88% and 80%) for both study and control groups respectively were married as shown in (Table 1). This is something that can be expected with such population due to the nature of their profession as female oriented which means that they have a desire in the profession and have the tendency to practice it and having their experience from their relative, mothers, sisters and others. Concerning educational level, the bulk of participants in both groups (80% and 76%) respectively were graduated from midwifery school as shown in (Table1). This result is similar to a study conducted by 11 in that they found the highest percentage of their participants (49.4%) were midwifery school graduates. According to 12, it revealed that the educational status plays an important role to raise the quality of knowledge Educational status always plays an important role in daily life. Practice of delivery care depends upon the knowledge about it and knowledge depends upon the educational status of the nurse” midwives. Relative to duration of practice in health agencies, The highest percentages of nurse-midwives (52% and 44%) for both study and control groups respectively, have (1-5) years of experience for employment in health agencies as shown (Table1). The current study results is in agreement with 13 that showed the highest percentages of nurses’ midwives (41.6%) (44.7%) for both study and control groups were having (1-5) years. The duration of practice in health agencies of the studied groups and the differences in the duration of practice in health agencies was statistically insignificant, (P>0.05), (Table 4.1). The correct responses of the study participants regarding the items of knowledge about progress of labor at baseline (Pre-test) revealed that proportion of participants in study group who were correctly responded toward the 10 questions in this domain ranged between (12%) toward the question How many phases are there in the first stage of labor? to (64%) for the question regarding what can the meconium stained amniotic fluid in the ruptured membranes indicates?. Among controls the correct responses ranged from (8%) regarding the question about the contraction of transition phase is characterized by one of the following? to (60%) for the question about what can the meconium stained amniotic fluid in the ruptured membranes indicates?, that means the higher proportion of participants in both studied group correctly responded about this question. However, the proportions of correct responses regarding all the 10 questions at pre-test were insignificantly different in between study groups and controls, in all comparisons, P.value > 0.05,
From researcher point of view, all midwives are knowledgeable about the colour of amniotic fluid, and they got this knowledge either from physicians or from the experienced midwives in the field of practice. Therefore this question is clear and very simple for all studied nurses midwives. After teaching program (Post-test 1), much improvement in the knowledge of study group regarding all items. For the knowledge about progress of labor all participants (100%) in the study group catch the correct responses towards 3 questions regarding the meconium stained amniotic fluid, nursing care during first active phase of labor and monitoring uterine contraction. Furthermore, (96%) of participants in the study group were correctly knew what is the first stage of labor is often referred to, and 96% correctly knew the normal fetal heart rate. For the other items, the proportions of correct responses ranged (68%) to (84%). Among controls, no such changes in the proportions of correct responses towards all items of this domain, therefore, a highly significant differences were reported between study group and controls in the proportions of correct responses towards the items of knowledge about progress of labor domain (P<0.001), (Table 3). There are no standardised methods for detecting or grading the degree of meconium stained liquor. There is also variation between intra-observer and inter-observer detection of meconium stained liquor There is a linear association between the thickness of meconium stained liquor and abnormal fetal heart rate patterns during labor, low Appgar scores and risk for caesarean section birth (15). At post-test 2, participants in study group still had higher proportions of correct responses. Despite these proportions were relatively lower than that reported in post-test 1, they still much higher than that of controls for all items and the differences were highly significant, (P<0.001 to 0.002), (Table 4). Both groups showed higher percentage of correct answers (100 %),(44%) for study and control groups, respectively upon question 5 that stated “If you are assessing the color of the amniotic fluid in the ruptured membranes, the meconium stained fluid can indicate”.

Table 1- Baseline characteristics of the study group and controls

<table>
<thead>
<tr>
<th>Baseline characteristics No.</th>
<th>Study group (N = 25)</th>
<th>Control group (N = 25)</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 – 30</td>
<td>11</td>
<td>10</td>
<td>0.41**</td>
</tr>
<tr>
<td>31 – 40</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>&gt; 40</td>
<td>5</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>22</td>
<td>20</td>
<td>0.70*</td>
</tr>
<tr>
<td>Single, Divorced or widowed</td>
<td>3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing school</td>
<td>1</td>
<td>1</td>
<td>0.98*</td>
</tr>
<tr>
<td>Midwifery school</td>
<td>20</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Nursing secondary school</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Institute of nursing</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Duration of Nurses Employment in Health Agencies(year)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>13</td>
<td>11</td>
<td>0.78*</td>
</tr>
<tr>
<td>6-10</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>&gt;10</td>
<td>7</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Duration of experience in delivery room (year)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>18</td>
<td>15</td>
<td>0.70*</td>
</tr>
<tr>
<td>6-10</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>&gt;10</td>
<td>4</td>
<td>6</td>
<td></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 progress of labor

<table>
<thead>
<tr>
<th>Items No.</th>
<th>Study group (N = 25)</th>
<th>Control group (N = 25)</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>How many phases are there in the first stage of labor?</td>
<td>3 12.0</td>
<td>4 16.0</td>
</tr>
<tr>
<td>Q2</td>
<td>The first stage of labor starts with the onset of?</td>
<td>9 36.0</td>
<td>7 28.0</td>
</tr>
<tr>
<td>Q3</td>
<td>The duration of the first stage of labor in primi mothers is?</td>
<td>5 20.0</td>
<td>3 12.0</td>
</tr>
<tr>
<td>Q4</td>
<td>Which of the following phases is characterized by the most intense phase often difficult to cope; may experience various emotions: irritable, agitated, and hopeless?</td>
<td>5 20.0</td>
<td>5 20.0</td>
</tr>
<tr>
<td>Q5</td>
<td>If you are assessing the color of the amniotic fluid in the ruptured membranes, the meconium stained fluid can indicate:</td>
<td>16 64.0</td>
<td>15 60.0</td>
</tr>
<tr>
<td>Q6</td>
<td>Nursing care during first active phase of labor is?</td>
<td>8 32.0</td>
<td>6 24.0</td>
</tr>
<tr>
<td>Q7</td>
<td>The first stage of labor is often referred to the stage of?</td>
<td>6 24.0</td>
<td>9 36.0</td>
</tr>
<tr>
<td>Q8</td>
<td>The contraction of transition phase is characterized by one of the following?</td>
<td>5 20.0</td>
<td>2 8.0</td>
</tr>
<tr>
<td>Q9</td>
<td>The normal fetal heart rate is?</td>
<td>12 48.0</td>
<td>10 40.0</td>
</tr>
<tr>
<td>Q10</td>
<td>What the monitoring uterine contraction is to determine?</td>
<td>10 40.0</td>
<td>9 36.0</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 progress of labor

<table>
<thead>
<tr>
<th>Items No.</th>
<th>Study group (N = 25)</th>
<th>Control group (N = 25)</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>How many phases are there in the first stage of labor?</td>
<td>21 84.0</td>
<td>6 24.0</td>
</tr>
<tr>
<td>Q2</td>
<td>The first stage of labor starts with the onset of?</td>
<td>21 84.0</td>
<td>8 32.0</td>
</tr>
<tr>
<td>Q3</td>
<td>The duration of the first stage of labor in primi mothers is?</td>
<td>18 72.0</td>
<td>4 16.0</td>
</tr>
<tr>
<td>Q4</td>
<td>Which of the following phases is characterized by the most intense phase often difficult to cope; may experience various emotions: irritable, agitated, and hopeless?</td>
<td>20 80.0</td>
<td>3 12.0</td>
</tr>
<tr>
<td>Q5</td>
<td>If you are assessing the color of the amniotic fluid in the ruptured membranes, the meconium stained fluid can indicate:</td>
<td>25 100.0</td>
<td>14 56.0</td>
</tr>
<tr>
<td>Q6</td>
<td>Nursing care during first active phase of labor is?</td>
<td>25 100.0</td>
<td>5 20.0</td>
</tr>
</tbody>
</table>
The first stage of labor is often referred to the stage of?  

<table>
<thead>
<tr>
<th>Question</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>Q7</td>
<td>24</td>
<td>96.0</td>
<td>8</td>
</tr>
<tr>
<td>Q8</td>
<td>17</td>
<td>68.0</td>
<td>4</td>
</tr>
<tr>
<td>Q9</td>
<td>24</td>
<td>96.0</td>
<td>9</td>
</tr>
<tr>
<td>Q10</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 Progress of labor domain

<table>
<thead>
<tr>
<th>Items No.</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</td>
<td>25</td>
<td>100.0</td>
<td>5</td>
</tr>
<tr>
<td>Q2</td>
<td>23</td>
<td>92.0</td>
<td>6</td>
</tr>
<tr>
<td>Q3</td>
<td>23</td>
<td>92.0</td>
<td>4</td>
</tr>
<tr>
<td>Q4</td>
<td>23</td>
<td>92.0</td>
<td>5</td>
</tr>
<tr>
<td>Q5</td>
<td>25</td>
<td>100.0</td>
<td>11</td>
</tr>
<tr>
<td>Q6</td>
<td>22</td>
<td>88.0</td>
<td>7</td>
</tr>
<tr>
<td>Q7</td>
<td>24</td>
<td>96.0</td>
<td>8</td>
</tr>
<tr>
<td>Q8</td>
<td>21</td>
<td>84.0</td>
<td>3</td>
</tr>
<tr>
<td>Q9</td>
<td>22</td>
<td>88.0</td>
<td>11</td>
</tr>
<tr>
<td>Q10</td>
<td>24</td>
<td>96.0</td>
<td>10</td>
</tr>
</tbody>
</table>
Table 5 - Comparison of changes in mean score of knowledge about progress of labor domain before and after teaching program

<table>
<thead>
<tr>
<th>Progress of labor domain Mean</th>
<th>Study group (n = 25)</th>
<th>Controls (n = 25)</th>
<th>Effect size</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Pre test</td>
<td>3.24</td>
<td>1.16</td>
<td>2.68</td>
<td>1.82</td>
</tr>
<tr>
<td>Post-test 1</td>
<td>9.28</td>
<td>1.10</td>
<td>2.88</td>
<td>1.22</td>
</tr>
<tr>
<td>Post-test 2</td>
<td>8.80</td>
<td>1.29</td>
<td>2.80</td>
<td>1.47</td>
</tr>
<tr>
<td>Mean difference Post1 – Pre</td>
<td>6.04</td>
<td>0.96</td>
<td>0.20</td>
<td>2.40</td>
</tr>
<tr>
<td>Mean difference Post 2 – Pre</td>
<td>5.56</td>
<td>1.57</td>
<td>0.12</td>
<td>2.30</td>
</tr>
<tr>
<td>Mean difference Post 2 - Post 1</td>
<td>0.48</td>
<td>1.42</td>
<td>-0.08</td>
<td>1.98</td>
</tr>
</tbody>
</table>

Pairwise comparisons (P. values)

<table>
<thead>
<tr>
<th></th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post 1 vs. Pre</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Post 2 vs. Pre</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Post 1 vs. Post 2</td>
<td>0.100</td>
</tr>
</tbody>
</table>

CONCLUSION

Improvement in the knowledge of study group of nurse midwives after teaching program (post-test) regarding progress of labor domains.

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, Al-Hilla City, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

8. Acharya A. knowledge and practice of delivery care ,Athesis submitted to health education department in partial fulfillment of the requirements of masters degree in health education. Tribhuvan University Faculty of Education Janta Multiple Campus Department of Health Education. 2016.


Prevalence of Burnout among physicians in a Kerbala, Iraq

Mohammed Abdulhussein Abdulzahra Almhana1, Ali Abdulridha Kadhim Abutiheen2,
Amer Fadhil Al- Haidary 3

1Al Hindya Health district \Kerbala Health Directorate, Iraq, 2Department of Family & Community Medicine\College of Medicine\University of Kerbala, Iraq, 3Department of Medicine \ College of Medicine\University of Kerbala, Iraq

ABSTRACT

Burnout is a stress-related disorders of global concern, also it is associated with decreased job performance and low career satisfaction. Its common among physicians and more risky because of their work nature as they deals with human lives. Burnout might indiscernible passed undiagnosed or managed. To determine the prevalence of burnout amongst physicians in Kerbala and identify factors associated with burnout. A cross-sectional survey was conducted among doctors using a validated self-administered questionnaire based on the Maslach Burnout Inventory Human Services Survey (MBI-HSS) with adding some questions related to Iraqi context and what physicians encounter. Ethical approval was obtained from research ethics committee in college of medicine – University of Kerbala. A total of 296 physicians filled and returned the questionnaire with a response rate of 84%. In terms of burnout, 52.7% of respondents scored high for emotional exhaustion burnout, 14.3% for depersonalization and 25.9% for personal accomplishment. High level of burnout in all three dimensions of burnout recorded among 4.4%. Burnout was found to be strongly associated with younger age and less years of employments. Burnout seems to be a common problem among physicians in Kerbala due to workload and stress. Emotional exhaustion was the commonest form of burnout.

Keywords: burnout, burnout syndrome, physicians, emotional exhaustion, depersonalization, personal accomplishment, Kerbala.

INTRODUCTION

Burnout is a psychological condition characterized by emotional and physical exhaustion caused by facing work stress for a long period of time. Also it is defined as prolonged response to chronic emotional and interpersonal job Stressors. The idea of burnout was presented by the psychosocial literature in the middle of the 1970s by Freudenberger and Maslach who introduced the burnout to the world 1-4. Burnout consists of three dimensions which are emotional exhaustion, depersonalization, and personal accomplishment. Emotional exhaustion is a sense of persons who are excessively subjected to exhaustion due to heavy work load. Depersonalization is a signs of attitudes and performances of neglected and absence of sensation towards persons as unique persons to whom they are introduce care and service. Personal accomplishment refers that persons who find themselves can positively overcome troubles. 4-6. Burnout syndrome among physicians is common and attaining a global concern. Burnout prevalence varies across different specialties and location from almost null up to 80%. This could be related to the sensitive and serious nature of physicians work and also to high working hours for most of them. Whereas excessive working hours and work overload are major risk factors for burnout, other factors includes non-secure working environment, poor relations with other working staff, low social support and working in poorly functioning organization. Burnout can result in an actual suffering for physicians and their families whether they notice that or not. 6-12. Physicians who have burnout have greater risk to be unable to make decisions; show aggressiveness during dealing with patients; and may exposed to high medical errors. So affecting the quality of services they produce, patient satisfaction and even the health or safety of their...
patients. Further, burnout physicians are more probable to job dissatisfaction, change or leave their clinics, and seek for sick leave. The personal reaction of burnout can be psychological with symptoms like anxiety, anger and depression. Or psychosomatic, including headaches, nausea and sleep troubles, with risk for ill persons safety. Other feature of burnout includes mental exhaustion, musculoskeletal complain, and increased danger of cardiovascular illnesses. This study aims to identify the prevalence of burnout syndrome among physicians in Kerbala Governorate, and to recognize common types and associated factors.

**MATERIALS AND METHOD**

A cross sectional study, was conducted among physicians from all health sectors and hospitals in Kerbala Directorate. The data collection was done between the 1st March and 15th of June, 2018. Of total 770 physicians (specialist and general practitioners in Kerbala) according to planning department in Kerbala Health Directorate. A total of 350 physicians were selected randomly. With aimed sample size of 300 physician to overcome any nonresponse or non-complete answers. Study includes specialists and general practitioners working in Kerbala Health Directorate. Junior doctors, residents, postgraduate and retired doctors were excluded from study. A special self-administered questionnaire form was used to identify burnout among doctors was based on the Maslach Burnout Inventory (MBI). Which is a validated 22-item questionnaire reflected the criterion standard device for measuring burnout. Some demographic questions putted in the beginning and some questions related to local Iraqi society such as tribal claims with physicians was added. A pilot study was conducted as initial steps includes 13 physicians, only one of them refuse to participate in the study and other physicians find the questions were easily understood. So minor changes done to it. Ethical approval on research was taken from Research ethics committee in Medical College – University of Kerbala. Further a verbal consent was taken from each participant prior to give him the questionnaire after short explanation of study objectives, and assuring the confidentiality of responses and the questionnaire was anonymous. The MBI has three dimensions: Emotional Exhaustion nine questions (1,2,3,6,8,13,14,16,20), Depersonalization five questions (5,10,11,15,22), Personal Accomplishment eight questions (4,7,9,12,17,18,19,21). Those who scored high on either the emotional exhaustion (score of 27 or higher) or depersonalization (score of 10 or higher) domain of burnout were considered to have at least one manifestation of professional burnout (29) or high score for medical professionals on the depersonalization and/or emotional exhaustion subscales were considered to have at least one manifestation of professional burnout (30). Physicians were considered to be experiencing at least one symptom of burnout based on a high emotional exhaustion score or a high depersonalization score.(31).

The term of high level (degree) of burnout pointing to a physicians who has all criteria of Human Maslach Burnout Inventory (MBI-Human Services Survey). Analysis of data was carried out using the statistical package for social science (SPSS 23).

**RESULTS AND DISCUSSION**

Of total 350 doctors who received the questionnaire 294 doctors fill it and retain it back with response rate 84%. Of those, 171(58.2%) were male, 144 (49%) between age 40-49 years with mean (±SD) was 43.9(±SD) (7.7) years. Out of the total sample 269 (91.5%) were married. The participants with board qualification was 119 (40.5%) as shown in table 1.Majority of responding doctors, 168 (57.1%) were working in both governmental and private sectors, 248 (84.4%) had above 10 years of employment, 184 (62.6%) had above 8 hours of working per day. While the mean working hours exceed 9 hours. Moreover the majority are working for more than 5 days in private sectors. Regarding resting day, 280 (95.2%) had resting day. Only 86 (29.3%) were practicing sport. And 33 (11.2%) were currently smoker. As showed in table 1. Of those who employee in governmental sectors, 148 (50.5%) work in hospital, 82 (28%) work in primary health care, the rest working in other places. For those who working in private sectors, 163 (96.4%) had private clinic, 4 (2.4%) were work in private hospitals and 2 (1.2%) had other private work. Of those who had resting day, 116(41.4%) not travel during vacation, and 123 (43.9%) sometime travel during vacation and only 41(14.6%) usually travel during vacation day. Of those who practicing sport, 28(32.6%) practicing sport one time weekly, 26(30.2%) two time weekly, 14(16.3%) three time weekly, 6(7%) four and five time weekly and 3(3.4%) six and seven time weekly.

**Degree and prevalence of burnout subscales:** Emotional exhaustion, depersonalization and personal accomplishment were categorized into low, moderate and high level based on original classification according
to the MBI and mean (±SD) was obtain for each level and to total scale.

**Emotional exhaustion:** The majority of responding doctors 155 (52.7%) had high emotional exhaustion while 80 (27.2%) show moderate emotional exhaustion and only 59 (20.1%) show low emotional exhaustion. The total mean score was 27.8 and 28 was median score. The 95% confidence interval for mean was 26.3-29.2 and standard error of mean was 0.72.

**Depersonalization :** Majority of responding doctor 175 (59.5%) had low depersonalization with mean score was 3.09, the participants with moderate depersonalization was 77 (26.2%) with mean score 9.4 and where 42 (14.3%) show high depersonalization. The total mean was 6.7 and the 95% confidence interval for mean was 6.1-7.4 and standard error of mean was 0.32.

**Personal accomplishment:** Burnout was correlated reversely with personal accomplishment. The responding doctors with low personal accomplishment were 76 (25.9%) and 85 (28.9%) showed moderate personal accomplishment. While those with high personal accomplishment were 133 (45.2%) with mean score 43.4. the total mean score was 35.8 and median was 37. The 95% confidence interval for mean was 34.8-36.9 and standard error of mean was 0.51. Summarized results of burnout criteria are shown in table 2. First manifestation of burnout was diagnosis by present of high emotional exhaustion and/or high depersonalization and this revealed in 163(55.4%) while 131 (44.6%) had no burnout. While high level of burnout was identified based on original classification of the MBI (high emotional exhaustion, high depersonalization and low personal accomplishment), only in 13(4.4%) had high level of burnout. Emotional exhaustion regard the core or central for diagnosis of burnout. The study revealed high level of emotional exhaustion was 52.7%. A close results reported by a study in Baghdad 54% 19. However, sample in Baghdad were of younger age and majority were resident doctors not specialized. They did not shows high level emotional exhaustion. Also similar results reported in Saudi Arabia 53.5% 20, while a higher percent of emotional exhaustion reported in a study in Kuwait of 63.2% among general practitioners 21. On the other hand lower results were reported in several studies 46.9% in USA 22 and 19.8 % in Australia 23 and in Qatar 11.89% 24. These result could be due to a better organization, stable circumstances, less stress on physicians and lower number of clients. Current study reported a high depersonalization rate of 14.3% which is much less in what reported in a study in Baghdad which gives 78.7 rate of high depersonalization 19. This could be related do difference in sample as above, or it could be related to the investigation tool used and calculation method which was not clear though it based on the MBI tool. However, close results of 13.7% reported in a study in Dubai 25. Studies in Saudi Arabia and Bosnai Hercegovina reported 38.9% and 45.6% rates respectively (20,26). While, reverse to these results studies in other countries gives lower levels for depersonalization as in Iran (27) 3.2% and in Australia 6.1 % (23). These variation could be related to cultural differences or nature of health systems in each country. High level of burnout was present among 4.4% of the physicians.

**Table 1:** The socio-demographic characteristics for the doctors in Kerbala governorate(n=294).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Governmental</td>
<td>125</td>
<td>42.5%</td>
</tr>
<tr>
<td>Governmental + private</td>
<td>169</td>
<td>57.5%</td>
</tr>
<tr>
<td>Years of employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 10 years</td>
<td>47</td>
<td>15.6%</td>
</tr>
<tr>
<td>&gt; 10 years</td>
<td>248</td>
<td>84.4%</td>
</tr>
<tr>
<td>Mean(SD) = 19.2 years (7.7), Minimum = 4 years, Maximum = 44 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours of working per day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤8 hours</td>
<td>89</td>
<td>30.2%</td>
</tr>
<tr>
<td>&gt;8 hours</td>
<td>205</td>
<td>69.8%</td>
</tr>
<tr>
<td>Mean(SD) = 9.2(2) hours, Minimum = 7 hours, Maximum = 16 hours</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1: The socio-demographic characteristics for the doctors in Kerbala governorate (n=294).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Yes</th>
<th>No</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had resting day</td>
<td>280</td>
<td>14</td>
<td>95.2%</td>
</tr>
<tr>
<td>Practicing sport</td>
<td>86</td>
<td>208</td>
<td>29.3%</td>
</tr>
<tr>
<td>Current smoking history</td>
<td>33</td>
<td>261</td>
<td>11.2%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>171</td>
<td></td>
<td>58.2%</td>
</tr>
<tr>
<td>Female</td>
<td>123</td>
<td></td>
<td>41.8%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤29 years</td>
<td>8</td>
<td></td>
<td>2.8%</td>
</tr>
<tr>
<td>30-39 years</td>
<td>65</td>
<td></td>
<td>22.1%</td>
</tr>
<tr>
<td>40-49 years</td>
<td>144</td>
<td></td>
<td>49%</td>
</tr>
<tr>
<td>≥50 years</td>
<td>77</td>
<td></td>
<td>26.1%</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>18</td>
<td></td>
<td>6.1%</td>
</tr>
<tr>
<td>Married</td>
<td>269</td>
<td></td>
<td>91.5%</td>
</tr>
<tr>
<td>widow</td>
<td>5</td>
<td></td>
<td>1.4%</td>
</tr>
<tr>
<td>Divorced</td>
<td>3</td>
<td></td>
<td>1%</td>
</tr>
<tr>
<td>Qualification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.B.CH.B</td>
<td>103</td>
<td></td>
<td>35%</td>
</tr>
<tr>
<td>Diploma</td>
<td>55</td>
<td></td>
<td>18.8%</td>
</tr>
<tr>
<td>Master</td>
<td>17</td>
<td></td>
<td>5.8%</td>
</tr>
<tr>
<td>Board</td>
<td>119</td>
<td></td>
<td>40.5%</td>
</tr>
</tbody>
</table>

Mean (SD) =43.9 (7.7) years, Minimum=27 years, Maximum=68 years.

Table 2: The results according to MBI criteria.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Number</th>
<th>Percent</th>
<th>Mean (SD)</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional exhaustion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (0-16)</td>
<td>59</td>
<td>20.1%</td>
<td>10.6(4.4)</td>
<td>12</td>
</tr>
<tr>
<td>Moderate (17-26)</td>
<td>80</td>
<td>27.2%</td>
<td>21.4(2.6)</td>
<td>21</td>
</tr>
<tr>
<td>High (≥27)</td>
<td>155</td>
<td>52.7%</td>
<td>37.6(6.8)</td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>294</td>
<td>100%</td>
<td>27.8(12.3)</td>
<td>28</td>
</tr>
<tr>
<td>Depersonalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (0-6)</td>
<td>175</td>
<td>59.5%</td>
<td>3.09(2.1)</td>
<td>3</td>
</tr>
<tr>
<td>Moderate (7-12)</td>
<td>77</td>
<td>26.2%</td>
<td>9.4(1.6)</td>
<td>10</td>
</tr>
<tr>
<td>High (≥13)</td>
<td>42</td>
<td>14.3%</td>
<td>17.3(4)</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>294</td>
<td>100%</td>
<td>6.7(5.6)</td>
<td>6</td>
</tr>
<tr>
<td>Personal accomplishment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (0-31)</td>
<td>76</td>
<td>25.9%</td>
<td>23.8(6)</td>
<td>25</td>
</tr>
<tr>
<td>Moderate (32-38)</td>
<td>85</td>
<td>28.9%</td>
<td>34.8(2.2)</td>
<td>35</td>
</tr>
<tr>
<td>High (≥39)</td>
<td>133</td>
<td>45.2%</td>
<td>43.4(2.8)</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>294</td>
<td>100%</td>
<td>35.8(8.8)</td>
<td>37</td>
</tr>
</tbody>
</table>
Table 3: The distribution of some variables with presence of burnout among doctors in Kerbala Governorate (no. =294).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age in years Mean (SD)</th>
<th>Years of employment Mean (SD)</th>
<th>Hours of working / day Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burnout</td>
<td>Present</td>
<td>42(7.2)</td>
<td>18.1(7.3)</td>
</tr>
<tr>
<td></td>
<td>Not</td>
<td>45.1(8.1)</td>
<td>20.5(8.1)</td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>0.013*</td>
<td>0.008*</td>
</tr>
</tbody>
</table>

Table 4: Relation of type of employment, gender, marriage status and qualification and smoking history, resting day and practicing sport with burnout.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Present</th>
<th>Burnout</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Smoking history</td>
<td>Yes</td>
<td>23(69.7%)</td>
<td>10(30.3%)</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>140(53.6%)</td>
<td>121(46.4%)</td>
<td>261</td>
</tr>
<tr>
<td>Had resting day</td>
<td>Yes</td>
<td>152(54.3%)</td>
<td>128(45.7%)</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>11(78.6%)</td>
<td>3(21.4%)</td>
<td>14</td>
</tr>
<tr>
<td>Practicing sport</td>
<td>Yes</td>
<td>46(53.5%)</td>
<td>40(46.5%)</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>171(56.2%)</td>
<td>91(43.8%)</td>
<td>208</td>
</tr>
<tr>
<td>Type of employment</td>
<td>Governmental</td>
<td>70(56%)</td>
<td>55(44%)</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>Governmental + private</td>
<td>93(55%)</td>
<td>76(45%)</td>
<td>169</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>92(53.8%)</td>
<td>79(46.2%)</td>
<td>171</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>71(57.7%)</td>
<td>52(42.3%)</td>
<td>123</td>
</tr>
<tr>
<td>Current marriage status</td>
<td>Married</td>
<td>150(55.7%)</td>
<td>119(44.3%)</td>
<td>269</td>
</tr>
<tr>
<td></td>
<td>Not</td>
<td>13(52%)</td>
<td>12(48%)</td>
<td>25</td>
</tr>
<tr>
<td>Qualification</td>
<td>M.B.Ch.B</td>
<td>60(58.2%)</td>
<td>43(41.7%)</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>Diploma/master</td>
<td>34(47.2%)</td>
<td>38(52.8%)</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>Board</td>
<td>69(58%)</td>
<td>50(42%)</td>
<td>119</td>
</tr>
</tbody>
</table>

CONCLUSION

Burnout syndrome was prevalent among physicians in Kerbala but it was passed and never measured or screened before. This high prevalence is probably related to high workload, high working hours, job stress and other stressors in Iraq. Fortunately high level of burnout was relatively low. Emotional exhaustion was the commonest form of burnout. Unfortunately burnout is underestimated and not considered seriously. While it need to be recognized as an occupational hazard among physicians and need to be assessed and managed.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Al Hindya Health district \ Kerbala Health Directorate, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

3. Kristensen TS, Borritz M, Villadsen E, Christensen KB. The Copenhagen Burnout Inventory: A new


15. Schrijver I. Pathology in the medical profession?: taking the pulse of physician wellness and burnout. Archives of pathology & laboratory medicine. 2016;140(9):976-82.


Serum level assessment of serum level of Neopterin (NP) and Anti-Cyclic Citrullinated Peptide (ACCPA) Antibody as markers of disease severity in rheumatoid arthritis

Mortadha Mohammed Husein1, Ali Mansoor2

1Medical Microbiology / Faculty of Medicine, University of Kerbala, Iraq, 2Clinical Immunology / Faculty of Medicine, University of Kerbala, Iraq

ABSTRACT

Rheumatoid arthritis is a chronic systemic autoimmune inflammatory disease characterized by synovitis and joint and cartilage destruction. Rheumatoid arthritis occurs when the immune system works incorrectly. This study aims to estimate the neopterin and anti-cyclic citrullinated peptide antibody as immunological markers that associated with the disease activity treatment response. The methodology of the study is conducted by the case-control study design. The test group consisted of 124 patients with rheumatoid arthritis. Control group that numbered (50). Serum neopterin and (ACCPA) concentrations were measured by Enzyme immunoassay. Statistical analyses were applied to analyze the research data. The results have shown the mean level of NP and ACCPA in the patient’s group, there is a highly significant difference in the disease activity. The main findings of this study, the neopterin and anti-cyclic citrullinated peptide antibody had significant differences with the severity of the disease which may be useful as immunological markers for the disease activity and monitoring of response to treatment.

Keywords: Rheumatoid arthritis; neopterin; risk factors; Immunopathogenesis.

INTRODUCTION

Rheumatoid arthritis: is a chronic systemic inflammatory autoimmune disease described by synovitis and joint damage and cartilage 1. (RA) occurs when the immune system works incorrectly. The RA disease is worldwide that prevalence in all populations. Both genders are affected, but about 2/3 of patients are female. The main reason for RA is unknown, but it has been suspected that a complex interplay among environmental factors and genetic factors 2. The pathogenicity and etiology of RA is complex, and individual, environmental, and hereditary agents are risk factors for RA. In the pathogenicity of the RA patients, many processes are included. In the different stages of the disease, abnormality or impairment in the regulation of innate and adaptive immune responses may occur 3. Autoantibodies in the last decade have a significant relation with rheumatoid arthritis RA 4. About 50 to 80% of arthritis patients have autoantibodies 5. The rheumatoid factor (RF) and ACCPA are the most prominent autoantibodies that detected in patients with RA 6. About (70%) of the rheumatoid arthritis patient serum, positive for ACCPA. The interaction that leads to autoantibody production against a set of citrullinated autoantigens modified post-translationally. ACCPA appear before 15 years from the onset of arthritis, and the titer of ACCPA is elevated with disease development 7. Cytokines play an essential role in the pathogenicity of rheumatoid arthritis, despite the complexity of the expansion of the cytokine networks expression inside the joints or systemically 8. A significant rise of the pro-inflammatory cytokines and some of the anti-inflammatory cytokines e.g. interleukin10 and IL4 in the serum in patients before the development of RA and in RA patients 9. Increased levels of pro-inflammatory cytokines are one of the important properties of rheumatoid arthritis 4. Neopterin, a pyrazino-pyrimidine

Corresponding author:
Mortadha Mohammed Husein.
Medical microbiology / Faculty of Medicine, University of Kerbala, Iraq.
E-mail: sharifmortadha0@gmail.com

DOI Number: 10.5958/0976-5506.2019.00428.5
compound, it is derived of 7, 8, dihydroneopterin that is biosynthesized from guanosine triphosphate (GTP), and produced basically by macrophages and dendritic cell response to gamma interferon that present in body fluids, and released during activation of TH1 cells \(^{(10)}\). In RA, excessive stimulation of monocyte (macrophage) cells via T cells, and can be the neopterin is considered as a marker for innate and cellular immune activity in RA patients \(^{(11)}\). The importance of neopterin in the pathophysiology of arthritis is still unclear. According to reports, the neopterin considered as one of the parameters of T-cells /macrophage cells activation (immune activation) in patients with RA, the level and production of neopterin reduced with treatment \(^{(12)}\). Previous studies that determine the correlation between neopterin and rheumatoid arthritis activity revealed a significant reduction in this relationship with disease activity markers during suitable treatment, as well as its use for treatment monitoring in autoimmune disease \(^{(12, 13)}\). In the present study, aims at an estimation of the neopterin (NP) and anti-cyclic citrullinated peptide antibody ACCPA as immunological markers to monitor the disease activity. Furthermore, whether these markers are considered as indicators for treatment response. This is what our study aims to achieve.

**MATERIAL AND METHOD**

**Population and Sample Size**

Two groups included in the current study, first, the patient group that numbered (124) (108 female and 16 male) ranging (20-70) years in age that classified into three groups (mild, moderate, and sever) (35) mild, (42) moderate and (47) severe according to American College of Rheumatology classification, some of these patients groups are taking treatment and others don’t take treatment (49) irregular treated and (75) regular treated, the second is the control group (healthy persons not suffered from any disease) that numbered (50) (41 female and 9 male). The patients and controls (174 people) were age-matched.

**Study Design**

The test group consisted of 124 patients with rheumatoid arthritis. The test group was subdivided according to age, gender, the severity of disease, treatment type, and duration of the disease.

**Methods**

**Measurements of the Serum Neopterin and (ACCPA) concentration.**

Serum neopterin concentration and ACCPA were measured by Enzyme immunoassay for the quantitative determination in human serum by using (enzyme-linked immunosorbent assay ELISA)

**Measurements of the C-Reactive Protein (CRP) and Rheumatoid Factor (RF) in serum.**

In vitro quantitative determination of Rheumatoid Factor (RF) concentration in serum measured by nephelometry method. This was based on the principle of antigen-antibody complex, can be detected by measuring the turbidity is in direct proportion to the concentration of RF and CRP of the sample.

**Estimation of Disease activity scale (DAS)**

The disease activity was assessed by the evaluation of the DAS-28 based on CRP concentration. The DAS-CRP score is a combination of information from the 28 tender and swollen joints, the CRP and the patient’s visual analog scale (VAS). The DAS-CRP was calculated by a web-based calculator:

**Statistical Analysis**

All statistical analysis was performed by using SPSS v.24 software program. The Application normality of the distribution, using non-parametric tests for variables that were not followed normality of the distribution was including Kruskal-Wallis Test (Multiple Comparisons), in addition to Chi-square Test. Also, it was drawing histograms and figures of correlation test by Microsoft Excel 2013. Data were expressed as (mean ± SE), statistically significant at (p-value<0.05) \(^{(14)}\).

**RESULTS AND DISCUSSION**

There are two groups of patients population in this study, the first group that intake treatment (regular treated) and the second group that not intake treatment (irregular treated).

The results have shown a significant difference (P<0.05) in the mean of all parameters (ESR, RF, CRP, NP, ACCP, and D.duration) in (RA) patients compared with the healthy group as in table (1). The mean level of Neopterin (NP) (21.45±0.78 *) nmol/L statistically...
have a highly significant difference (P<0.05) in a regulated treated group, the results demonstrate that the mean level of (ACCP) (83.89±6.37*) is high and has a significant difference (P<0.05) in case of treated patients table (2), as alongside, there is a significant reduction in the level of ACCP in the treated group, so the ACCP has a significant correlation with the treatment response. Statistically, the results showed the mean level of NP and ACCP (56.77±5.49 *) (150.81±10.79 *), in patients group, have a highly significant difference (P<0.05) in disease activity respectively as in table (3). In our study, the demographic parameters (Age, Gender) table (1) indicated that no significant difference in the mean age of the rheumatoid arthritis patients when compared with the mean age of the healthy group. Current results about the mean of Age in RA patients compared with healthy group agree with Delnia Arshadi et al., they reported that the difference of the age, age of onset and disease duration between male and female RA patients was also analyzed in this study. There was no significant difference in age, age of onset and disease duration between female and male RA patients (15). In the table (2), All patients with rheumatoid arthritis (RA) whether regulated treated or not, the results demonstrate that the mean level of (ACCP) is high and has a significant difference in case of treated patients, at the same time, we have observed a significant reduction in the level of ACCP in the treated group, so the ACCP has a significant correlation with the treatment response. The ACCP compare with the severity of disease. Statistically, the results appear highly a significant difference in case of moderate and severe of disease activity but no significant difference in case of mild activity of disease table (3). We will review some of the results of the studies that were compatible and not compatible with the results of the study. Tien-Tsai Cheng et al., refers to regarding variables related to RA disease activity, the rate of RF+ and levels of DAS28-ESR were significantly different among the groups and correlated with anti-CCP levels. The investigation revealed that the anti-CCP levels were correlated with RA disease activity. Zhou, Lin et al., that found a higher significant correlation between high disease activity and the mean of CCP, ESR, CRP and RF than patients with low to moderate disease activity (17). While Carolin Wunderlich et al and S. Modi et al., found in their studies, in RA cases with longer disease duration, it has been shown that add-on treatment primary targeting the adaptive immune system reduces ACPA levels, which associates with reduced disease activity and improved health (18), (19). Also, Cambridge et al, showed that both ACPA IgG and IgA decreased after rituximab treatment. In the treated group of rheumatoid arthritis patients in the table (2), Neopterin (NP) statistically have a highly significant difference while in the irregulated treatment group have no significant difference. About correlation of severity of disease, the neopterin statistically have highly a significant difference for the severity of the disease. In our study, we found the neopterin have a strong correlation with disease activity and regulation of treatment and these results meet the objective of the study. There are many studies that have proven that, so the results were identical to our results in the study. Previous studies found that neopterin correlated with disease activity in RA and decreased with treatment (21, 22). In 2013, D’agostino et al., evaluated neopterin plasma concentrations in patients with early Rheumatoid Arthritis and correlated them with disease activity. They detected a statistically significant elevation of neopterin mean concentration in early RA patients (23). In 2016 Dalia El-Lebedy et al., serum level of neopterin in treated RA patients as a marker of disease activity. Showed significantly higher levels of neopterin in RA patients compared to control subjects.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mean±SE</th>
<th>Control N=50</th>
<th>Chi-2</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameters</td>
<td>Patients N=124</td>
<td>Control N=50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGE (year)</td>
<td>47.82±1.09</td>
<td>46.82±1.93</td>
<td>0.298</td>
<td>0.58</td>
</tr>
<tr>
<td>Male</td>
<td>53.07±3.726</td>
<td>50.67±4.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>47.10±1.123</td>
<td>45.98±2.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.duration</td>
<td>8.92±0.64</td>
<td>0.00</td>
<td>109.075</td>
<td>0.000</td>
</tr>
<tr>
<td>1-10 (year)</td>
<td>4.91±0.32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11-20 (year)</td>
<td>14.4 ±0.51*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20 (year)</td>
<td>28.43±1.71*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (1): comparison of the clinical characteristics and the studied markers between patients with rheumatoid arthritis and control group.
Cont...

**Table (1):** Comparison of the clinical characteristics and the studied markers between patients with rheumatoid arthritis and control group.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mean±SE</th>
<th>Chi-2</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regular treated N= 75</td>
<td>Irregular treated N= 49</td>
<td></td>
</tr>
<tr>
<td>AGE (year)</td>
<td>48.11±1.47</td>
<td>47.39±1.63</td>
<td>0.022</td>
</tr>
<tr>
<td>D.duration</td>
<td>9.61±0.83</td>
<td>7.87±0.98</td>
<td>2.885</td>
</tr>
<tr>
<td>ESR (mm/hr)</td>
<td>50.65±2.82 *</td>
<td>95.18±2.04</td>
<td>66.141</td>
</tr>
<tr>
<td>RF (IU/ml)</td>
<td>74.13±5.17</td>
<td>89.32±7.17</td>
<td>2.176</td>
</tr>
<tr>
<td>CRP (mg/L)</td>
<td>31.18±3.75 *</td>
<td>119.82±10.77</td>
<td>51.42</td>
</tr>
<tr>
<td>NP (nmol/L)</td>
<td>21.45±0.78 *</td>
<td>71.69±4.35</td>
<td>75.310</td>
</tr>
<tr>
<td>ACCP (U/ml)</td>
<td>83.89±6.37 *</td>
<td>118.26±12.14</td>
<td>3.519</td>
</tr>
</tbody>
</table>

**Table (2):** Clinical properties parameters of (RA) patients compared with the regulation of treatment.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mean±SE</th>
<th>Chi-2</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regular treated N=75</td>
<td>Irregular treated N=49</td>
<td></td>
</tr>
<tr>
<td>AGE (year)</td>
<td>42.37±1.97</td>
<td>50.31±1.83 *</td>
<td>49.66±1.72 *</td>
</tr>
<tr>
<td>D.duration</td>
<td>6.99±0.94</td>
<td>8.25±0.89</td>
<td>10.96±1.26 *</td>
</tr>
<tr>
<td>ESR (mm/hr)</td>
<td>54.40±5.21</td>
<td>58.86±4.02</td>
<td>86.96±3.44 *</td>
</tr>
<tr>
<td>RF (IU/ml)</td>
<td>35.6±4.24</td>
<td>80.55±4.90 *</td>
<td>112.93±6.57 *</td>
</tr>
<tr>
<td>CRP (mg/L)</td>
<td>21.41±3.62</td>
<td>48.36±6.2 *</td>
<td>115.53±11.85 *</td>
</tr>
<tr>
<td>NP (nmol/L)</td>
<td>19.8±0.95</td>
<td>41.93±4.10 *</td>
<td>56.77±5.49 *</td>
</tr>
<tr>
<td>ACCP (U/ml)</td>
<td>44.67±6.38</td>
<td>81.79±6.15 *</td>
<td>150.81±10.79 *</td>
</tr>
</tbody>
</table>

**Table (3):** Clinical features and the studied markers of (RA) patients compared among 3 groups of the severity of disease (mild, moderate and severe).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mean±SE</th>
<th>Chi-2</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild N= 35</td>
<td>Mo = 42</td>
<td>S =47</td>
</tr>
<tr>
<td>AGE (year)</td>
<td>48.25±2.72 *</td>
<td>68.25±0.62</td>
<td>98.213</td>
</tr>
<tr>
<td>RF (IU/ml)</td>
<td>80.13±4.26 *</td>
<td>4.04±0.28</td>
<td>75.985</td>
</tr>
<tr>
<td>CRP (mg/L)</td>
<td>66.21±6.18 *</td>
<td>6.1±0.50</td>
<td>86.733</td>
</tr>
<tr>
<td>NP (nmol/L)</td>
<td>41.3 ±2.83 *</td>
<td>3.45±0.27</td>
<td>106.332</td>
</tr>
<tr>
<td>ACCP (U/ml)</td>
<td>97.47±6.31 *</td>
<td>3.93±0.36</td>
<td>106.298</td>
</tr>
</tbody>
</table>

**CONCLUSION**

The neopterin and Anti-Cyclic Citrullinated Peptide Antibody are a marker for disease activity in untreated RA patients but not a marker for evaluation of disease activity in treated RA patients, in addition to neopterin considered a good marker for monitoring response of treatment. Thus, further cohort studies with larger sample size are recommended to assess the relationship between neopterin level and pathogenesis of RA.

**Declaration of Interest:** All authors have no
conflict of interest.

**Source of Funding:** Source of fund for this project was by authors itself.

**Ethical Clearance:** After the approval of protocol by the Ethical Review Board for human studies, faculty of medicine/university of karbala / Iraq and before enrollment, all subjects gave their written informed consent.

**REFERENCES**


2. Wei ST. Serum levels of IL-6 and TNF-α may correlate with activity and severity of rheumatoid arthritis. Medical science monitor: international medical journal of experimental and clinical research. 2015; 21: 4030.


7. Law SC. T-cell autoreactivity to citrullinated autoantigenic peptides in rheumatoid arthritis patients carrying HLA-DRB1 shared epitope alleles. Arthritis research & therapy, 2012; 14(3): R118.


19. Modi, S., M. Soejima, and M.C. Levesque, The effect of targeted rheumatoid arthritis therapies on anti-citrullinated protein autoantibody levels...


The Need for Discharge Plan for Patients with Coronary Artery Diseases in Critical Care Units

Shatha Saadi Mohammad¹, Sahar Adhem Ali²

¹University of Babylon /College of Nursing, Iraq, ²University of Babylon, Dr. Hussam Abbas Dawood Lecturer
University of Babylon, Iraq

ABSTRACT

Quantitative - descriptive design in critical care units at Babylon teaching hospitals, this cross sectional study carried from the period 2nd of June 2017 to 31 Augustus 2017. To assess the needs of patients with coronary artery disease for discharge plan. Non-probability purposive sample consisted of (100) patients who admitted to all the critical care units after their discharge from these units were selected. A questionnaire which were previously prepared used to collect the data by direct interview individually. An ethical agreement was obtained from the patients to participate in this study, and the questionnaire needs (15-25) minutes to complete all the data. A questionnaire includes six parts: first part: demographic characteristics, second part was general information, third part life arrangement and home activities fourth part daily activity and physical exercise, fifth part medications, sixth part diet and fluid. The finding out of the study shows that all the patient with coronary artery disease need to discharge plan. A high significant difference between the patients’ need to discharge plan and the treatment, the patients’ psychological needs but there was poo response for items related to fluid and diet.

Key words: discharge plan, coronary artery disease, and critical care units.

INTRODUCTION

Coronary artery disease is one of the most serious diseases affecting human health, leading to more disability, economic cost and death. It is considered one of the most serious and common chronic diseases where it threatens more than thirteen million people suffering from coronary heart disease, more than six million people suffered from angina. While people with heart attack are estimated to be nearly seven million.¹ Coronary artery disease has an impact up on the economic situation more than any other single disease and causes a lot of disability and mortality over the world especially in developed countries². USA records indicated that about 1.3% of the patients aged 18 to 45 years have coronary heart disease and 7% of people between the ages of 45 and 64 years suffer from the same condition. While 20% of the people their aged 65 and over accounted for the highest incidence of coronary artery disease ³. In Iraq the mortality rate increased from twenty- seven thousand to five hundred and thirteen because of coronary heart diseases according to statistics which published in 2014 from world health organization ⁴. The aims of implementing the discharge plan from the health personals in the hospital correctly is to reduce the patient’s long stay in the hospital also to improve the coordination of services after the discharge to home and reduce the frequency of admission to the hospital. An appropriate leaving plan consist of devises and instructions which should be provided to the patients or for family members. Discharge from the hospital should be well planned demonstrated with proper place and time. The results of the studies which study discharge plans for chronic disease found that the structured discharge plan for patients lead to decrease readmission and decrease days of hospitalization and improve patient’s satisfaction toward health care services ⁵. Discharge planning is multi characteristics to continuance of health care; this process includes the
following: identification and assessment of patient, goals, planning, implementation of care, coordination, evaluation the care and it is consider the quality link between community services, nongovernment hospital, organizations and health team. Discharging planner may be a nurse, primary nurse, social workers, leader of the unit, and attending physicians. The discharge of patients from the hospital is a complex process surrounded by challenges. In 2010 more than 35 million patients were discharged from hospitals in the United States, including Medicare patients. With more than 20% returning to hospital within 30 days. In 2004, the re-admission of patients to the hospital cost about 17.4 billion US dollars. Accounting for 17% of the total paid hospital care. We can improve the quality of life for patients significantly and improve the financial well-being of the health care system by avoiding re-admission to hospitals. It was noted that the ineffective discharge plan had an effect on the patient physically and psychologically and his disease experience. Health care planning leads to provide adequate information also involve patients and their families and healthcare professionals to decrease the disruption.

METHODOLOGY

Quantitative - descriptive design was used to assessment of patients with coronary artery diseases needs to discharge plan in Babylon teaching hospitals. Originally, this cross sectional study carried from the period 1 Sep. 2016 to 31 August 2017. Tow teaching hospital which located Hila-city were selected to collect the study sample who certainly admitted to the coronary care unit and previously diagnosed with ischemic heart disease. Non-probability purposive sample consisted of (100) patients who admitted to the coronary care units or admitted to the medical ward after their discharge from C.C.U were selected. Structured questionnaire which previously prepared used to collect the data by direct face to face individually after the researcher meet each participant individually after their agreement to participant in the study, the questionnaire needs (15-25) minutes to complete all data. Collection of the data from 16 March 2017, to 25 May 2017. The questionnaire includes sex parts: Part I, Demographic characteristics, Part II, general information, Part III, life arrangement and home activities domain, Part IV, Daily activity and physical exercise, Part V, The medications domain. A statistical analysis were used for collection of the data, which was descriptive (Percentages and frequencies, Mean score and standard deviation) and inferential data analysis (ANOVA).

RESULTS AND DISCUSSION

Table(1) shows that the majority of the study subjects (65%) were male, (64%) were 60 and above 60 years old, (41%) were illiterate, related to occupation most of the study sample (34%) were retired, rural residents (59%), married (81%), and have insufficient monthly income (64%). Table 2 shows that the responses of the study sample related to the treatment recorded good except items 1, 2, 6, 7 and 8 which presented poor responses which consist information about the action and side effects of the medication. Table 3 shows that the overall assessment of the treatment domain items of the patients with coronary artery disease is good. Table 4 shows that the overall assessment of the diet and fluids domain items of the patients with coronary artery disease is poor. Table 5 shows that the overall assessment of the psychological domain items of the patients with coronary artery disease is good. The demographical characteristics of the study sample which presented in table (1) shows that the majority of the sample (65%) were male (64%) were over 60 years old, this results agree with the study which carried out upon patient with cardiac disease. The study of (11, 12) interacts positively with the present study findings, they stated that the majority of the study sample (59%) were male, while the female are (41%), 88(47%) of the participant out of (760) with 61 years old or more, overall, male exposed to coronary artery disease more than female and gender play un effective risk factors, while patient age consider another risk factors for coronary disease. Regarding to the educational level most of the sample (41%) were with low educational level (illiterate), this finding agree with a study carried out by which find that most of the patient who suffer from cardiac disease were with low educational levels. Education is serious to economical and social progress and has a deep influence on health population, educational differences in individual health performances and experience of chronic anxiety act as more nearby reasons for chronic disease such as cardiac disease. Related to occupation most of the study sample (34%) were retired. This result agree with how stated that the majority of patient with cardiac disease (64.3%) were retired. The majority of sample with rural residency (59%). This result supported
by study conducted up on. Thirty million patients with heart disease in India, 16 million from rural areas while from urban reside 14 million. According to the marital status the majority of the sample were married (81%). This result normally according to older age of patient and supported by the (16) who find out that the high percentage of the participant in his study were married (84.6%). Table 2,3 shows that the responses of the study sample related to the treatment recorded good, presented poor responses which consist information about the action and side effects of the medication. The overall assessment of the treatment domain items of the patients with coronary artery disease is good. This fact supported by 17 who find out that more than half patients (56.5%) adherence to medications. After cardiac event provide to patient medication that change lifestyle, take medication can reduce recurrence of cardiac event. The poly medications associated with cardiovascular disease treatment, medication side effects, and medication costs may negatively impact adherence. Usually 4-5 drugs patient take just related to the cardiology illness. Increases prescriptions drugs correlate with decreases in adherence. The different doses and dosing schedules for each drug make it difficult for the patient to stay compliant. To help patients cope with poly medications and stay compliant with dosing schedules, the use of pill boxes to organize daily doses and the use of prepackaged blister packs consisting of daily doses helpful. Due to medication side effects, patients delay or discontinue taking a medication. For example, in patients receiving dual antiplatelet therapy, nuisance bleeding associated with (thienopyridine) use has been shown to result in unnecessary (thienopyridine) cessation. An outpatient management system of pharmacists, nurses, nurse practitioners, physician assistants, or physicians who are readily available to address patients’ concerns or to check in on patients may help resolve patients’ concerns and improve adherence. Cost of therapy is often a barrier to adherence, particularly for disadvantaged segments of the population (18). Table (4) presented that the responses of the study sample related to the diet and fluid, the overall assessment of the diet and fluids domain items of the patients with coronary artery disease is poor. Data shows only 23% of patients consume fruit regularly which give a dark prospect about health education and poor socio-economic state of population. Also 19 in their study the quality of diet of (555) patients with CHD using 24-h diet. They find that patients don’t made the required change to their nutrition’s to assistance in decrease the risk of a secondary coronary artery disease occurrence. Studies showing the quality support effect on disease progress. Patients with low social support consider worse after heart attack, low support significantly increase the depression, worse health, and poorer quality of life 20.

Table (1) Allocation of the Socio-Demographical Characteristics of the Study Sample.

<table>
<thead>
<tr>
<th>Demographic Data</th>
<th>Rating And Intervals</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Age / years</td>
<td>30-39</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>50-59</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>60 and more</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Levels of education</td>
<td>Illiterate</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Able to read and write</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Primary school</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Intermediate school</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Secondary school</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Institute and more</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>
### Cont.. Table (1) Allocation of the Socio-Demographical Characteristics of the Study Sample.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Free workers</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Retired</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Jobless</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Housewife</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Residency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>Urban</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Married</td>
<td>81</td>
<td>81</td>
</tr>
<tr>
<td>Widowed</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

### Table (2) Patients’ Responses Related to Treatment Domain Items

<table>
<thead>
<tr>
<th>Items</th>
<th>Rating</th>
<th>Freq.</th>
<th>%</th>
<th>m.s.</th>
<th>assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Did you get comprehensive and description on drugs that you will use after you leave the hospital (medicine name, dose, frequency).</td>
<td>No</td>
<td>49</td>
<td>49</td>
<td>1.51</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>51</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Have you been given instructions by the members of the health team for some drugs that must be on an empty stomach or after eating?</td>
<td>No</td>
<td>3</td>
<td>3</td>
<td>1.97</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>97</td>
<td>97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Do you know what to do if you forget a dose of the drug</td>
<td>No</td>
<td>83</td>
<td>83</td>
<td>1.17</td>
<td>poor</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>17</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Do you have sufficient information about each medications side effect</td>
<td>No</td>
<td>82</td>
<td>82</td>
<td>1.18</td>
<td>poor</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>18</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Do you have sufficient information about way to store medication</td>
<td>No</td>
<td>5</td>
<td>5</td>
<td>1.95</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>95</td>
<td>95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Do you stop taking the medication when signs and symptoms disappear and you feel of good health</td>
<td>No</td>
<td>27</td>
<td>27</td>
<td>1.73</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>73</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Do you change the dose of the medication without consulting your doctor</td>
<td>No</td>
<td>31</td>
<td>31</td>
<td>1.69</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>69</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. When taking diuretic would you avoid drinking large amounts of fluid</td>
<td>No</td>
<td>16</td>
<td>16</td>
<td>1.84</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>84</td>
<td>84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Do you tell you the health team that some medications may affect the ability to exercise and impair the regulate the body temperature</td>
<td>No</td>
<td>92</td>
<td>92</td>
<td>1.08</td>
<td>poor</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table (3) Overall Assessment of Patients’ Responses to the Treatment Domain Items

<table>
<thead>
<tr>
<th>Main domain</th>
<th>Rating</th>
<th>Freq.</th>
<th>%</th>
<th>m.s.</th>
<th>assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment domain</td>
<td>Under cut off point</td>
<td>31</td>
<td>31</td>
<td>1.56</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td>Above cut off point</td>
<td>69</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (4) Overall Assessment of the Patients’ Responses to the Diet and Fluids Domain Items.

<table>
<thead>
<tr>
<th>Main domains</th>
<th>Rating</th>
<th>Freq.</th>
<th>%</th>
<th>m.s.</th>
<th>assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet and fluids domain</td>
<td>Under cut off point</td>
<td>73</td>
<td>73</td>
<td>1.42</td>
<td>poor</td>
</tr>
<tr>
<td></td>
<td>Above cut off point</td>
<td>27</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (5) Overall Assessment of the Patients’ Psychological Needs to Discharge Planning

<table>
<thead>
<tr>
<th>Main domain</th>
<th>Rating</th>
<th>Freq.</th>
<th>%</th>
<th>m.s.</th>
<th>assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological domain</td>
<td>Under cut of point</td>
<td>8</td>
<td>8</td>
<td>1.91</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Above cut off point</td>
<td>92</td>
<td>92</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure (1) Overall Assessment of Patients’ Responses to the Treatment Domain Items

CONCLUSION

The study concluded that there was poor responses to all items of discharge plan. Relationship between the patients’ need to discharge plan and their demographic data non-significant. Regarding to the treatment most patient good adherence but they haven’t enough information about the action and side effects of the medication.

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 Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

3. Alper E, O’Malley TA, Greenwald J. Hospital discharge and readmission. 2015; 1: 20
5. Al-Zurfy AK, Muhbes FJ. Assessment of Patients Compliance Regarding Therapeutic Regime with
Coronary Heart Disease in Al-Najaf City. Kufa Journal for Nursing Sciences. 2015; 5(3).


Automated Retinal Imaging System for Detecting Cardiac Abnormalities Using Cup to Disc Ratio

S. Palanivel Rajan1, L. Kavitha2
1Associate Professor, 2PG Scholar, Department of Electronics and Communication Engineering, M.Kumarasamy College of Engineering (Autonomous), Karur, Tamilnadu, India

ABSTRACT

This advanced and adaptable world that consists of diseases that are due to the cardiovascular disease (CVD) plays a salient role in human health that leads to severe problems even death. It is described that the range of disorders affecting the heart. Over 23 million people would be died from CVD every year by 2030. The cardiovascular disease may be preventable if they are properly predicted and proper kind of treatment should be provided at the initial stage so that 90% of them would be avoided. The extraction of information present inside the retinal tissues is the main function, which is used in the case of prediction of CVD and a suitable treatment should be given at the earlier stage of the diseases such as stroke, blood pressure, hyper tension, glaucoma etc. The retinal images is taken and then pre-processed. Then, they are segmented and featured extracted. By having their result, arteries and veins are classified through the support vector machine (SVM). The cup-to-disc ratio (CDR) is calculated by having the values of optical disc and optical cup diameters and the calculations are made to find the normal and abnormal images. Hence, the presence of CVD through the retinal images is predicted and analyzed in this paper.

Keywords: Artery/vein classification, Boundary extraction, Feature extraction, Image edge detection, Medical diagnostic imaging, Retinal vessels, Thresholding (Imaging)

Introduction

In the human body, there are many health issues might be present but CVD is the major issue. This CVD plays a deathly part in human life as might leads to death in a short span of time. In the human eye, the retinal layer is the most important part from where the microcirculation and the blood vessels could be directly imaged, giving a facility to have a study regarding the structure, method and pathology involved in the blood circulation in human eye and the responsibility to note down the changes present in the microvasculature that relates to the enhancement of CVD diseases (Rajan et al.3). From the retinal inputs within which the veins and arteries have been secluded, from that their diameters are measured.

They are two classifications such as central retinal veins equivalent (CRVE) and then the central retinal artery equivalent (CRAE). Cardiovascular diseases (CVD) such as Hypertension, glaucoma and coronary heart disease are the most primitive diseases (Dhivya et al.27). Optic nerve is used to connect the human brain and the eye. The segmentation is performed by the précised and accurate extraction of the retinal blood vessels which plays a significant role for the automated diagnosis system development. Here, A/V classification and the diseases are recognized (Ribana et al.13).

Related Work

In the previous existing system, the retinal vessel region is the trade pipeline whose significant part is the improvised exudates of the painting channel which is going through decreasing the false recognition that is formed at the hearty refinement of exudates (Seebock et al.12). One RF classifier is used for the highlights gained from the comparative layer and the victor is used for collecting the forecasts of the RF classifier used (Vijayprasath et al.29).

With the help of 2D images, the linear structures are identified that have the response in multi-scale. In case of small datasets, the convolutional filters are used for enhancing the process. Here, a fuzzy-means algorithm is applied and it is used to get rid of the presence of noises and then the edge texture closer to its boundary (A.M.R. et al.5). The texture noise produced by the fake vessel
edges is the main problem and the presence of cup in the red channel area would lead to this contour mistaken in the cup boundary of the edges of the disc (Rajan et al. 20).

This focuses on developing the existing algorithms for segmenting the blood vessel in retina, comparing their performances and to achieve superior performance. The retinal images are taken from the database Digital Retinal Images for Vessel Extraction (DRIVE) had been already used. This DRIVE database is having 40 images where each of the 20 images is taken for training and testing. These algorithms were applied on the original images (Johnson et al. 2). Hence, to improve the performance results, the proposed system is taken.

Proposed System

In this proposed system, the DRIONS database is used to pick the retinal images and their performance is measured here. From the DRIONS database, nearly 110 color retinal images are taken for the processing. It is obtained from total of 124 eye fundus images, that are selected in a random manner and base is belonging to the Ophthalmology Service situated at Miguel Servet Hospital situated in Saragossa. These images are taken for the testing that is discussed further (Zhengguo at al. 4).

To preserve those parameters, a recent algorithm has to be proposed (Aswini et al. 6). For filtering the retinal images, median filter is used. It is a nonlinear filter, used in removing the presence of noise in the input images and preserves its edges and it is effective in removing the ‘salt and pepper’ noises and the purpose is running along the signal through each entry by entry and replacing every entry with median value of its neighboring entries (Kedir et al. 1). Image segmentation is the process that can be defined as partitioning a digital image into many of the multiple segments (Dubose et al. 28). It involves in two processes namely Channel Extraction and Histogram Equalization shown in Fig.No.1.

**Feature Extraction and Thresholding:** Feature Extraction is used to extract the information from every feature of the retinal vessels. This process is used to identify the objects and its boundaries present in the images (Hu et al. 30). The image is binarized using the thresholding method. And then the blood vessels are detected. Whereas the thresholding is the way of partitioning an image into a foreground and background, the gray scale images are converted into binary images because it is fundamentally denoted by ‘0’ or ‘1’ (Li et al. 17) and the selection of the threshold value or the values is done when multiple-levels are selected (Dai et al. 30).

The circle Hough Transform (CHT) is used to detect the presence of circles in the imperfect image of feature extraction and it is unaffected by image noise is the main advantage (Pellegrini et al. 7). They are generated by “voting” method in the Hough parameter space and the selected local maxima is called accumulator matrix.

**Optic Cup and Disc Measurement:** The process of boundary Extraction is used to extract the edges from the binary image in Digital Image Process (DIP) (Johnson et al. 2). The measurement of Cup to Disc Ratio (CDR) is measured after the detecting the optic cup and optic disc. From these output, Cup to Disc Ratio (CDR) measurement is obtained by the measurement of an

---

**Table 1: Classification of Performance measure in terms of Arteries and Veins**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Accuracy</th>
<th>Specificity</th>
<th>Sensitivity</th>
<th>Error rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTERIES</td>
<td>0.8464</td>
<td>0.868</td>
<td>0.869</td>
<td>0.147</td>
</tr>
<tr>
<td>VEINS</td>
<td>0.8725</td>
<td>0.761</td>
<td>0.763</td>
<td>0.129</td>
</tr>
</tbody>
</table>

For this process, artificial neuron network (ANN) technique is used to find the normal and abnormal retinal fundus. They are considered as the nonlinear data statistical modeling tools, where the most complex and computational relationships between the inputs and outputs are examined or their patterns are identified (Hajabdollahi et al. 18).
optic disc and optic cup after the detection. In order to examine the vessel intensity information and A/V, SVM classification is used (Rajan et al.26). The normal and abnormal images are classified (Mohanapriya et al.22).

Results and Discussion

In this model, DRIONS database is used for taking the retinal images for CVD prediction. It is used to identify and select an image randomly (Rajan et al.15) and the pre-processing takes place in the input image and then segmented to find the presence of CVD in retinal images.

![Figure 2: (a) Binary Output Image, (b) Optic disc Iterations, (c) Final Optic disc Output, (d) Optic cup Iterations](image)

Pre-processing and Feature Extraction: Input images from the DRIONS database undergoes pre-processing which is similar to the mathematical normalization of a data set is shown in Fig.No.2 (Rajan et al.18). The pre-processing of an image includes the gray scale conversion and filtering of the input images that aims at selectively removing the redundancy present in captured images without affecting the details of the original information of an input image (Sureshjani et al.24). Image pre-processing that may have huge positive effects on the quality of the image segmentation and the feature extraction (Sil Kar et al.19). The parameters measurements and their calculated specifications are given, which is used to measure the performance.

\[
\begin{align*}
1. & \quad \text{Accuracy} = \frac{(Tn + Tp)}{(Tn + Tp + Fn + Fp)} \\
2. & \quad \text{Specificity} = \frac{Tn}{(Tn + Fp)}
\end{align*}
\]

Conted…

<table>
<thead>
<tr>
<th>Measuring Parameters</th>
<th>Accuracy</th>
<th>Precision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Methodology</td>
<td>0.87</td>
<td>0.71</td>
</tr>
<tr>
<td>K-Means Clustering</td>
<td>0.843</td>
<td>0.67</td>
</tr>
</tbody>
</table>

The representation of TP is True Positive, TN is True Negative, FP is False Positive and FN is False Negative (Zhou et al.21). In channel extraction, by applying the Gaussian smoothing of the red or green components of the image, the channel information gets extracted. The features of the vessel are arteries and the veins (Dubose et al.28).

Cup to Disc Ratio Measurement: The optic cup and disc diameters are measured from the featured extracted output (Rajan et al.23). CDR is the ratio of vertical cup diameter to the vertical disc diameter. Their segmentation results are shown in Table No. 2.

Table 2: Segmentation of Optic Disc Measurement Result Comparison

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cup</th>
<th>Disc</th>
<th>CDR</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>97</td>
<td>39</td>
<td>0.34</td>
<td>Normal</td>
</tr>
<tr>
<td>2.</td>
<td>112</td>
<td>53</td>
<td>0.39</td>
<td>Normal</td>
</tr>
<tr>
<td>3.</td>
<td>119</td>
<td>67</td>
<td>0.55</td>
<td>Abnormal</td>
</tr>
<tr>
<td>4.</td>
<td>119</td>
<td>71</td>
<td>0.59</td>
<td>Abnormal</td>
</tr>
<tr>
<td>5.</td>
<td>133</td>
<td>96</td>
<td>0.69</td>
<td>Abnormal</td>
</tr>
</tbody>
</table>

The performance parameters like accuracy, specificity and sensitivity are included (Manikandanan et al.8). The images are classified as normal or abnormal.
depending on the result taken from the CDR value and their performance measurements for the different database models are taken and compared in Table No.4.

Table 4: Comparison of proposed performance measurements to the existing systems

<table>
<thead>
<tr>
<th>Database Input</th>
<th>Accuracy</th>
<th>Specificity</th>
<th>Sensitivity</th>
<th>AUC</th>
</tr>
</thead>
<tbody>
<tr>
<td>STARE</td>
<td>0.98</td>
<td>0.98</td>
<td>0.88</td>
<td>0.85</td>
</tr>
<tr>
<td>DRIVE</td>
<td>0.94</td>
<td>0.99</td>
<td>0.83</td>
<td>0.86</td>
</tr>
<tr>
<td>DRIONS (Abnormal)</td>
<td>0.95</td>
<td>0.99</td>
<td>0.97</td>
<td>0.87</td>
</tr>
<tr>
<td>DRIONS (Normal)</td>
<td>0.87</td>
<td>0.97</td>
<td>0.92</td>
<td>0.82</td>
</tr>
</tbody>
</table>

From the table DRIONS database that consists of both normal and abnormal images are taken and compared (Manikandan et al.8). From the above measured the CVD is predicted and the treatment is given earlier.

Conclusion

Recognition and treatment of CVD has been substantially talked about in this proposed system and processed by using numerous processes such as pre-processing, image segmenting, feature extraction and retinal vessel classification. Blood vessels are accurately identified and are classified. In optic disc segmentation, optic cup identification of has to be carried out and then accurate retinal ophthalmology measurements should be taken to get the CDR value. Finally, prediction of the CVD is possible using retinal images taken from the human eye.

Future Scope: Presence of smaller vein particles should be detected properly even when image is not clear or in case of presence of more noise. Hence, boundary detection in optic disc can be done by Geometric Active Contour Model (ACM) to increase the performance. Classification of vessels and presence of disease could be identified by the back-propagation multi layered perceptron neural network (BP neural network) to reduce the error in measurements.

Ethical Clearance: Taken from the committee

Source of Funding: NIL

Conflict of Interest: NIL

REFERENCES


3. S.Palanivel Rajan, V.Kavitha. “Diagnosis of Cardiovascular Diseases using Retinal Images through Vessel Segmentation Graph”. In Current Medical Imaging Reviews (Bentham Science Publisher). Online ISSN No: 1875-6603, Print ISSN No: 1573-4056. (Impact Factor–0.613). 2017; 13(4): 454-459,


7. Enrico Pellegrini, Gavin Robertson, Tom MacGillivray, Jano van Hemert, Graeme Houston


Effect of KIDNET, Karma Yoga Teaching and Nostalgic Street Games on the Self Knowledge of Orphan Girls

Neelam Sharma¹, Mahak²

¹Associate Professor and Head, ²PhD Scholar, Lovely Professional University, Phagwara

ABSTRACT

Self-knowledge is an intrinsic part of the personality. It helps an individual to have complete knowledge about their values and instincts. It’s motivates in achieving the goals and helps in regulating and modifying the behavior of an individual. The present study has been conducted to determine the effect of different training on the self-knowledge of orphan girls. For the study 20 orphan girls from Nari-Niketan of Udampur district having low self knowledge has been selected for the training. The training was given to the three groups and one was control group. Analysis of covariance (ANCOVA) has been used to measure the effect of different training on the self knowledge of orphan girls. To find out the significant difference Levene’s test was employed for the pair wise comparison to find out the mean difference between the different training groups and control group at 0.5 level of significance. After analyzing the data, it is concluded that there is significant difference was showed between the “Karma yoga teaching and Nostalgic Street games”, with p value 0.46. “Control and Karma yoga teaching group”, with p value 0.00, “KIDNET and Nostalgic Street games”, with p value 0.25. “Control and Nostalgic Street games”, with p value 0.00 and “Control and KIDNET”, with p value 0.00. There was insignificant difference was showed between the “Karma yoga teaching and KIDNET”, with p value 0.806. Hence it is concluded that KIDNET, karma yoga teaching and Nostalgic street games shows significant difference in improving the self knowledge among orphan girls as compare to control group but no significant difference is showed between the Karma yoga teaching and KIDNET group.

Keywords: KIDNET, karma yogic teaching, Nostalgic street games and self knowledge.

Introduction

Personality is considered to be an important component of the life. Personality means the sum total of the characteristics of an individual. Among the factors of personality self knowledge is considered as the core component of personality. In philosophy self-knowledge refers to knowledge of an individual’s own sensations, thoughts, beliefs, and other mental states. Self knowledge is also the knowledge or understanding of one’s own abilities, character, and feelings. Self-knowledge is a critical censorious of personality. The self-knowledge study has been barely devised; firstly focus on the role of individual and the trait conducts. Thus the word self knowledge means the person having complete knowledge about the values, liking, their purpose of life and the complete knowledge of aims. These energetic features are very important because they can be extensively disclosing the behavior of future. The contented and association of the complete self-knowledge is significant because it indicate the territory of behavior that is regarded as the most self-applicable. Secondly, having complete knowledge about the self rationally shows required and unrequited state for the self, in addition to that it provide prescribed knowledge about the ideas how to perceive the idea or how to ignore. Therefore it indicates the liable itinerary of behavior in self-pertinent domains. Number of research in the field in the field of self knowledge has been done to explain the concept of self knowledge. A number of latest research attempts can be explained as investigation of self-knowledge. Debiec and LeDoux ¹ conducted a study which revealed that conventional account of the self knowledge in belief, text, way of life, value and other kindling of the humanity, are stuck in the subject’s individual frame of mind. This basis of knowledge has been a dedicated shatter on terms, concepts, and self theories of life. By contrast, the systematic method, which uses experimental and exceptional data, is alert at the analysis of objective. The systematic access to the self, by its nature, is differ from the access in the humanity, and therefore it disclose
a different outlook of the self, and converse new dispute about what really the self is.

Janning\(^2\) knowledge about the self is moral question. It is a glossy of shielding me, Strandberg write, referring to Seneca In other terms, explain that what kind of personality I am is an enduring ballet between the two concept of “knowledge about self” and “self-deception”. Descartes\(^3\) ratified boundary. He revealed that there endure feelings, emotion and appetites. They clearly recognized that while making any kind of judgment we do not indulge any thing which we don’t have in our self awareness. Horgan and Kriegel\(^4\) in his study uses a theory of omniscience in that he confined to the consciousness to make a dispute on the qualified theory of dependability, the very basic idea about the theory of dependability reveals that because of experience individual become aware about the subject, the subject that carries a knowledge that is acquired through experience.

Descartes\(^5\) states the relation between the concept about the state of mental and the state of mental themselves that individual is having regarding them. Belief that an individual carries about themselves is the most philosophical argument regarding the self knowledge. Descartes in an argument argue that that the more carefully an individual caring his thoughts no one, even the supreme mighty can control the thoughts of an individual. No one can mislead the individual if the individual carefully handling their thoughts. Goldman\(^6\) state that the most common statement given regarding the term self knowledge is inner observation or the inward direction regarding self and self awareness regarding the self. The self knowledge is a method in which an individual achieve the knowledge about the self and inner instinct. For a child it is more important to have self knowledge as it help an individual to gain knowledge about his own thoughts and help in achieving the goals of and also help in redirection and modifying their behavior. Skinner\(^7\) in study revealed that the child below the age category of 18 years is considered a child. The child who lost his both parent is called orphan, childhood is time in which child is more attached to his parents and the loss of parents at this stage used the child to make suffer from more psychological problems.

Objective: The objective of the study is to find out the effect of different training program on the self knowledge of orphan girls.

Hypothesis: The hypothesis of the study is that there exit significant relationship between the different training and self knowledge among orphan girls.

Material and Method

20 subject by using purposive sampling homogenous technique 20 orphan children between the ages of 12-18 has been selected from Nari Niketan Udhampur district (Jammu and Kashmir). There was a control group with 5 subjects and three experimental groups with the ratio of 5 in each group. The selection of training program, three different training program:- KIDNET, Karma yoga teaching and nostalgic street games and one control group and the variable to see effect is Self-knowledge. Self knowledge scale has been used in order to see the difference between the training programs. For analyzing the data analysis of covariance (ANVOCA) has been applied at 0.05 level of significance.

Findings

Table 1: Descriptive statistics of different training on the self knowledge of orphan girls

<table>
<thead>
<tr>
<th>Training program</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIDNET</td>
<td>90.40</td>
<td>5.02</td>
<td>5</td>
</tr>
<tr>
<td>Karma yoga teaching</td>
<td>89.60</td>
<td>5.85</td>
<td>5</td>
</tr>
<tr>
<td>Nostalgic street games</td>
<td>97.00</td>
<td>5.43</td>
<td>5</td>
</tr>
<tr>
<td>Control</td>
<td>78.40</td>
<td>2.70</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>88.85</td>
<td>8.20</td>
<td>20</td>
</tr>
</tbody>
</table>

The table 1shows the mean and standard values of different training program KIDNET 90.40 ± 5.02, Karma yoga teaching 89.60 ± 5.85, Nostalgic street games 97.00 ± 5.43 and Control group 78.40 ± 2.70.

Table 2: Levene’s test of equality of error variances Dependent Variable: post self knowledge

<table>
<thead>
<tr>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.490</td>
<td>3</td>
<td>16</td>
<td>.255</td>
</tr>
</tbody>
</table>

The table 2 Levene’s test of equality of variance shows the dependent variable post-test for the self knowledge. The Levene’s test has been found to be insignificant if the p values is more than 0.05. Also in above case it has been found insignificant as the p value is more than 0.05.
Table 3: Test of between subject effects for the scores of different training on the self knowledge of orphan girls

<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>Pre-Self knowledge</td>
<td>215.724</td>
<td>1</td>
<td>215.724</td>
<td>16.044</td>
<td>.001</td>
</tr>
<tr>
<td>Training program</td>
<td>861.138</td>
<td>3</td>
<td>287.046</td>
<td>21.348</td>
<td>.000</td>
</tr>
<tr>
<td>Error</td>
<td>201.688</td>
<td>15</td>
<td>13.446</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>159165.00</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>1278.550</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table 3 shows the p-value at 0.000 which was statistically significant at 0.05 level of significance among different training program (Karma Yogic Teaching, Nostalgic Street Games, KIDNET and Control) during pre testing of self-knowledge among orphan girls.

Table 4: Adjusted mean score of self knowledge test after the different training program

<table>
<thead>
<tr>
<th>Training program</th>
<th>Mean</th>
<th>Std. Error</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>KIDNET</td>
<td>90.276a</td>
<td>1.640</td>
<td>86.780</td>
</tr>
<tr>
<td>Karma yoga teaching</td>
<td>90.865a</td>
<td>1.675</td>
<td>87.294</td>
</tr>
<tr>
<td>Nostalgic street games</td>
<td>96.082a</td>
<td>1.659</td>
<td>92.547</td>
</tr>
<tr>
<td>Control</td>
<td>78.177a</td>
<td>1.641</td>
<td>74.679</td>
</tr>
</tbody>
</table>

The table 4 shows the estimated mean score of self knowledge test after the different training program viz. KIDNET (90.276a), Karma yoga teaching (90.865a), Nostalgic street games (96.082a) and control group (78.177a).

Table 5: Pair wise comparisons

<table>
<thead>
<tr>
<th>(I) Treatment</th>
<th>(J) Treatment</th>
<th>Mean Difference(I-J)</th>
<th>Sig. (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIDNET</td>
<td>Karma Yogic Teaching</td>
<td>-.589</td>
<td>.806</td>
</tr>
<tr>
<td></td>
<td>Nostalgic Street Games</td>
<td>-5.806*</td>
<td>.025*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>-12.099*</td>
<td>.000*</td>
</tr>
<tr>
<td>Karma Yogic Teaching</td>
<td>Nostalgic Street Games</td>
<td>-5.218*</td>
<td>.046*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>-12.688*</td>
<td>.000*</td>
</tr>
<tr>
<td>Nostalgic Street Games</td>
<td>Control</td>
<td>-17.906*</td>
<td>.000*</td>
</tr>
</tbody>
</table>

Based on estimated marginal means

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 5 shows the p-value for mean difference between different Training program viz; KIDNET and nostalgic street games. 025, KIDNET and control. 000, karma yogic teaching and nostalgic street games. 046, karma yogic teaching and control. 000, nostalgic street games and control group. 000. Further, all of the mentioned p-values are less than 0.05 level. Hence, are considered to be significant at 5% level. However, the p-value for mean difference between KIDNET and karma yogic teaching is. 806 which is above the threshold limit of 0.5 level of significance. Hence, they are considered to be insignificant. As per the above result it can be concluded that KIDNET, Karma yoga teaching and Nostalgic street games are found to be significant in improving self knowledge among orphan girls as compare to control group and there was insignificant difference was found in KIDNET and Karma yoga teaching group.
Discussion and Conclusion

The result of the analysis of covariance (ANCOVA) demonstrated significant difference in improving the variable self knowledge among orphan girls. Hence To find out the significant difference levene’s test was employed for the pair wise comparison to find out the mean difference between the different training groups and control group at 0.5 level of significance. Pair wise comparison indicate that KIDNET, Karma yoga teaching and Nostalgic street games are found to be significant in improving the self knowledge among orphan girls. The result of the study indicate that significant difference in “Karma yoga teaching and Nostalgic Street games”, with p value 0.46. “Control and Karma yoga teaching group”, with p value 0.00, “KIDNET and Nostalgic Street games”, with p value 0.25. “Control and Nostalgic Street games”, with p value 0.00 and “Control and KIDNET”, with p value 0.00. There was insignificant difference was showed between the “Karma yoga teaching and KIDNET”, with p value. 806. Kumar and kumar in his study revealed that karma yoga is that path which leads to the liberation. Liberation is the final stage of recognition. The knowledge of karma yoga teaches a way and lesson of life that how to work without thinking about the outcomes. Outcomes attachment results in stress, aggression and competition. Karma yoga teaching and its practice work effectively to provide knowledge to people to live a satisfactory life without thinking about the outcomes. Ruf et. al. conducted a study to examine the effect of narrative explosive therapy in improving the trauma among refuge children. The result of the study revealed that 8 session of narrative exposure therapy is effective in treating the trauma among refuge children. Mehr et al. conducted a study on school children and his study after analyzing the result researcher concluded that playing games improves self knowledge, self evaluation and gives a positive attitude towards a life.

Ethical Clearance: Nil

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

Automatic Retinal Lesions Detection of Diabetic Retinopathy Using Curvelet Based Enhancement

Banuselvasaraswathy B1, Arul Murugan C2, Karthigaikumar P3

1Department of Electronics and Communication Engineering, Sri Krishna College of Technology, Coimbatore; 2Department of Electronics and Telecommunication Engineering, 3Department of Electronics and Communication Engineering, Karpagam College of Engineering, Coimbatore

ABSTRACT

Diabetic Retinopathy is the eye disease caused in patient suffering from diabetes. Once the sugar level becomes high, it deteriorates retina leading to loss of vision. Therefore, lesion detection gained importance in treating diabetes. The main aim of this work is to propose an automatic detection of lesions using four steps such as pre-processing, optic disc removal and vessel extraction, post processing and candidate lesion detection. It starts with optic disc removal and vessel extraction followed by curvelet based enhancement to isolate dark lesions from retina. The optical disc is necessary for this system. To segment microaneurysms from the retinal image we proposed morphological filtering techniques and transformation. Curvelet based enhancement is used to improve the parameters such as specificity, accuracy and sensitivity in the proposed system. Performance analysis is carried out for specificity, accuracy and sensitivity of the proposed method. Additionally red lesion defect and glaucoma defect is also analyzed in this work.

Keywords: Microaneurysms, Hemorrhages, Exudates, Lesions, Curvelet based enhancement, matched filter, Laplacian of Gaussian.

Introduction

Today, there is a tremendous rise in population of diabetic patients due intake of less nutritious, increased urbanization and obesity especially in resource poor countries. As per World Health Organization (WHO), nearly 1.6 million people have died due to diabetes in 2015. It is enumerated that almost 425 million people are living with diabetes globally. By 2045, it is expected that this count may increase to 629 million all over the world. Thus prolonged and uncontrolled diabetes can easily harm the microvasculature of the vital organs like eyes and kidney present in the human body. Diabetes Person suffering from eye disease is called as diabetic Retinopathy (DR). It remains asymptomatic in its early stage. As it progress, results in blurred vision leading to blindness. There is no particular notable symptom in its initial stage that causes vision loss. In order to treat it at early stage automatic lesions detections or screening of eye were processed.

The damaged areas of retina are sectioned into three stages namely micro-aneurysms (Mas), hemorrhages (HEMs) and exudates (EXs). Microaneurysm is the first stage of DR. In this stage, tiny blood vessel starts swelling and small red color lesions are seen in retinal layer. Some of the lesions are thin and round or oval in shape. This stage is also called as bright lesions. The next stage is Hemorrages. It is mainly caused due to the rupture in the deep layer of retina and also by retinal ischemia. It is visible as bright red spots in different shapes. The final stage is exudates (EXs), they are yellowish-white lesions caused due to plasma leakage from the capillaries. DR’s microaneurysms is detected by analyzing the cross-sectional profile of the pre-processed image that remains rotating. Splat Feature detection is used for Hemorrages detection and classification. Exudate Detection is done by Exudate Segmentation in fundus image using optimization approach. The screening of DR is done by automatic computer-aided diagnosis (CAD) system to accurately identify the lesions. But the major drawback of the CAD approach is that the screening results will sometimes become more complicated when the blood vessels and lesions are similar in shapes, non-uniform illumination, irregular size and shape, poor contrast in presence of noise.
Related Works

There exist different approaches analysed by several researchers for accurately determining MAs, HMs and EXs either individually or in a collective way. In\(^1\) ant colony optimization algorithm is utilized to exudate segmentation in fundus image. In\(^2\) a hybrid classifier is designed. It is a combination of extended m-Mediods and Gaussian mixture model to enhance the accuracy of classification. Tang et al\(^3\) suggested a splat feature classification method in fundus images for the detection of haemorrhage in retina. In\(^4\) a model to detect MA in color images is designed. This method rejects false clutter response and allows only true Mas. The number of clutter class is minimized by successive rejection-based method. In\(^5\) MA on retina is identified by analyzing cross section profiles of the pre-processed image. In\(^6\) MA detection problem by adopting adaptive wavelet based template-matching technique was addressed. Further optimization process is carried out through genetic algorithm search followed by Powells direction set descent. But the main drawback of this method is, it fails to detect the MAs that appear in clusters as well as which are located close to blood vessels. In\(^7\) a novel dynamic shape feature method to detect both hemorrhages and microaneurysms is presented. Here, precise segmentation of image is not required. In\(^8\) the location of lesions using visual word dictionary and points of interests (PoIs) for identifying both bright and red lesions without any pre and post processing marked by the specialists are demonstrated. In\(^9\) a hybrid classifier is designed with combination of Gaussian mixture model and support vector machine to determine the exact location of lesions even under poor illumination. To Improve EX detection, a new hybrid classifier is designed which is an ensemble of Gaussian mixture model and support vector machine (SVM). In\(^10\) Fisher’s linear discriminant algorithm is introduced to classify retinal exudates by using color information available in the image.

From the above discussion, it is clear that different tools and techniques are used to determine the lesions and blood vessels, this increases the complexity. In this proposed method the mutual work of matched filter (MF) and Laplacian of Gaussian (LoG) were used for the operation of lesion detection. Matched Filter method not only gives approximate response to microaneurysms but also for Hemorrhages. Matched Filter along with LoG filter is used to estimate exudates and hemorrhages.

The paper is organised as follows: section 3 elaborates proposed methodology, section 4 deals with results and discussion and section 5 includes conclusion and future work.

Proposed Method

The various steps involved in proposed method are shown in figure 1. It consists of various processes namely extraction, pre-processing, enhancing brightness and contrast of image, computation of Log max, MFmax,T1,T2,T1’,T2’,T1’’,T2’’, pixel elimination.

![Figure 1: Flow Diagram the proposed method](image)

Extraction: Blood vessels in retinal images are visualized from the Optic Disc (OD). The blood vessels and OD should be removed completely in lesion detection because these are the sources for false positive sign for bright and dark lesion detection.
**Pre-Processing:** The pre-processing operations are done to recognize the appearance of different DR lesions as it varies from dark spot to yellowish colour in case of Mas, HEMs and EXs. However it is easy to find the EXs because of its yellowish spots whereas it is difficult to identify dark spot lesions of Mas and HEMs which is similar to background colour. Therefore it is necessary to apply edge enhancement technique to identify these lesions. Thus several pre-processing operations using edge enhancement technique are done as follows:

**Curvelet based Edge Enhancement for dark lesions:**
Curvelet transform is widely used since it is an efficient way of recognizing vertical, horizontal, directional details, diagonal edge, curvatures, contours missing and general boundary information etc., hence it is utilized to identify the edges of dark lesions from the background. It is performed by subdividing the entire image using curvelet transform. The resultant sub-bands are suppressed using different amplification factor. Then inverse curvelet transform is superimposed on the first band. This helps intensifying the dark lesion thus highlighting from the background.

**Ideal band pass filter for bright lesion upgrade:**
To protect the brilliant locales, morphological shutting operation is performed on the picture. This helps in smoothening the background segments of the picture and suppresses thin vascular nets fixing the position of bright lesion at one place. However, this shutting operation diminishes the contrast of image too. Therefore, to increase the contrast of EX image it is passed through a WBBF structure. The EX of image varies for a wide range of frequency spectrum in the retinal image. This frequency band varies from image to image. It is complex and tedious process to analytically calculate the gain (G), the lower and the upper cut-off frequencies fL and fU of ideal band pass filter (BPF) due to the involvement of several parameters.
\[ \sigma_{xy} = \text{covariance measure } Cx, \]
\[ Cy = \text{parameters to avoid instabilities when } (x')^2 + (y')^2 \text{ or } \sigma_{x1}^2 + \sigma_{y1}^2 \text{ tends to zero} \quad \ldots (1) \]

The MSSIM value is obtained by taking the average of SSIM over all the image blocks.

**Candidate Lesion Detection:** The steps to be followed for lesion detection are:
- Gaussian Laplace Filtering and Matched Filtering.
- Maximization of mutual information using DE.

In Gaussian Laplace Filtering and Matched Filtering, Matched Filter has 2D Gaussian Kernel and it produces the responses for the bright and dark lesions. These lesions are detected by utilizing Log-filter with the Matched Filter. The Mathematical expressions for a two dimensional prototype MF and LoG kernel are given by

\[ K_1(x_1, y_1) = -\exp(-x_1^2/2\sigma^2), \text{ for } |x_1| \leq (3\sigma) \quad \ldots (2) \]
\[ R_1(x_1, y_1) = \frac{1}{\sigma^22\pi} \left( \frac{x_1^2 - \sigma^2}{\sigma^4} \right) \exp\left( -\frac{x_1^2}{2\sigma^2} \right) \forall |x_1| \leq 3\sigma \]

for Where is the spread scale of the Gaussian function.

**Post Processing:** The pixels in the background, spurious components are also taken in account as the lesions. Thus post processing is very essential for different types of lesions. Thus for HEM, MA, EXs the regions for candidate lesions are obtained with help of the several methods such as threshold values, Disc shaped structuring element.

**Parameter Calculations**
- Sensitivity = TP/(TP + FN)
- Specificity = TN/(TN + FP)
- Accuracy = TP + TN/(TP + TN + FP + FN)

Where
- TP= correctly classified lesion regions
- FP=non-lesion regions detected as lesion
- TN=correctly classified non-lesion regions
- FN=lesion regions wrongly classified as non-lesion regions

**Results**

The simulated results of the person’s eye image are portrayed in the following figures.
Figure 6: Image resized to 256x256

Figure 7: Equalizing the contrast in RGB

Figure 8: Noise Removal and Adaptive Equalising

Figure 9: Color Normalization

Figure 10: Optic Disc Removal

Figure 11: Enhancing the Optic Disc Extraction
From the result it is inferred that the proposed work shows improvement in accuracy, specificity, sensitivity compared to the existing work. Even though several techniques were proposed still it appears as a consequence in detecting red lesions from the background in presence of poor illumination. Therefore, different algorithms can be used for detecting red lesions in future.

**Conclusion**

**Ethical Clearance:** Taken from the committee

**Source of Funding:** NIL

**Conflict of Interest:** NIL

**REFERENCES**


Human Health Monitoring System over Internet in Wireless Body Area Networks

B. Ramya¹, S. Jagadeesan²
¹PG Scholar; ²Associate Professor, Department of ECE, M. Kumarasamy College of Engineering, Karur, Tamil Nadu

ABSTRACT

Now-a-days maximum of people are affected by heart disease. Particularly heart attack is the major problem occurs everywhere. Heart attack causes millions of death in this world due to healthcare cost. In order to reduce the healthcare cost we proposed IoT technique to monitor the patient. Thingspeak server will helps the doctor to examine the patient without actual visiting. This paper introduces real time heart beat detection and monitoring system of a patient. Heart Beat Detection and Monitoring System using Raspberry pi that will detect the heart beat using the Pulse Sensor and will show the readings in BPM (Beats per Minute) on the LCD connected to it. It will also send the readings to ThingSpeak server using the Wi-Fi module ESP8266, so that Heart Beats can be monitored from anywhere in the world over the internet. ThingSpeak is a great source for displaying the data online and you can access the data from ThingSpeak at any time and at any place. So that doctors will provide immediate service from their place to the patient through SMS or email notification. The heartbeat of a patient is monitored so that life time of a patient will be increased. The cost to implement this technique is less and accuracy in monitoring is better than other techniques.

Keywords: Heart beat monitor, Raspberry Pi, Wi-Fi module ESP8266, ThingsSpeak - internet of things, LCD.

Introduction

The heart related problems are increased day by day. Not only the heart problems many other problems also arising everyday like kidney failure, lung disease, brain tumors etc., Because of these problems everyone should requires whole body test every year. If any of these problems is found then that patient should be monitored continuously. To monitor the patient many technologies have been improved. Wireless technology and remote health monitoring system are the recent technique to monitor the patient. This technique helps a doctor to monitor the patient anywhere in this world. There is no need for a patient to visit the doctor randomly. This technology may save many lives due to the immediate service through internet.

According to the survey, one person dies for every 30 seconds in India due cardio attack. Based on the current scenario this problem may increases because of the environmental conditions. The handling of heart patient is monitoring them always until the condition came to the control. IoT helps for remote heart beat monitoring system instead of manual heart beat monitoring system¹.

In some cases doctor may not available all the time to take care of a patient or keeper may not available all the time to take patient to hospital. In these cases remote heart beat monitoring system is useful. In this paper we proposed remote heart beat monitoring system to save someone life. In our proposed system we made a little change in wireless sensor technology is that wireless sensor should measure the blood pressure, body temperature, heart rate etc. The basic information of a patient will be transmitted to IoT platform through internet. The patient’s health history will be generated and this may be monitored and analyzed by doctors if they need. By the remote health monitoring system the parameters like blood pressure, body temperature, heart rate are easily measured². With the help of these parameters it is possible to give the better treatment for heart patient. Now-a-days people will like to prevent the disease or recognize the disease in initial stage. This technique will surely help everyone to diagnose the disease in their early stage.

In this paper we used the pulse sensor, Raspberry Pi, Wi-Fi module ESP8266 and LCD. The pulse sensor will measure the heart rate from child to elder person³.
Raspberry Pi is a low cost device that plugs to monitor or LCD. This device can access the python language. Hence this system is advanced wireless technology it is used for monitoring the patient. IoT is a system which connects the devices and sensors without human involvement. It is full of system based technique so possibility of error may less. This technique might save patients from future health problem and helps the doctor to take action in proper time.

Block Diagram and Its Specifications

The sensor is the main input component of the project, the LED light is emitted to the finger and the emitted back by the blood. The peak blood is captured by the photo transistor and given to the amplifier. The output of the amplifier is an analog waveform which is given to the MCP3208 IC. The IC is an analog to digital converter which gives digital data to the raspberry pi. The values thus fetched by the raspberry pi is processed and uploaded to the cloud server through hype text transfer protocol. The inbuilt wifi is connected to the nearest wifi router for establishing connection with the cloud server. The cloud server stores the received values and shows the real time plotting of the same.

System Design

The heart monitoring system consist of both hardware and software implementation. The IoT contains the Data acquisition and Data transmission process. For real time operation and raw data transmission the data acquisition method is used. MEMS technology is used to minimize the energy consumption during data acquisition process. Energy can be used efficiently by using ultra low power processor and threshold processor. In order to utilize the energy in efficient way high performance processor is also used. If the energy utilized by memory is reduced then there is improvement in embedded devices. By connecting the on chip sensors, Radio Frequency unit and power unit the data transmission process will be performed.
A. **Heart Beat Sensors:** Heart Beat can be measured based on optical power variation as light is scattered or absorbed during its path through the blood as the heart beat changes. The heart beat sensor is measuring the changes in volume of blood flow from one region to another region of body. The heart rate is defined as the number of times the heart beat per minute. It is important to notice the timing pulse while examine the heart beat of a patient. Based on the heart beat per minute the blood flow is measured and the light is absorbed by the blood. The heart beat sensor should consist of Light Emitting Diode and Photo diode or light detecting resistor.

![Heart Beat Sensor](image)

**Figure 3: Heart beat sensor**

The light is emitted by LED and it may be transmitted to the finger tissue since the blood absorbs the light. Amount of light absorbed in a tissue is measured by blood volume in that tissue. The output of the sensor may be in the form of DC signal. The electric signal should compensate AC signal and DC signal. Analog-to-digital converter is used to convert the analog signal into digital signal. MCP3208 ADC converter is used in this paper to convert the signal. The heart beat rate should be calculated by using the formula given below:

\[ \text{BPM (Beats per minute)} = 60 \times f \]

Where \( f \) is the pulse frequency.

B. **Raspberry Pi Zero:** Raspberry Pi is device which is small size one that contains all the functions like personal computer. This raspberry Pi should gives the information of a patient to LCD board display. It is a low cost device that connects many devices. The raspberry Pi contains processor, RAM memory, chip and connector is used to connect other devices. It supports the python code language to provide the necessary operation.

![Raspberry Pi Zero](image)

**Figure 4: Raspberry Pi Zero**

**Ports, Pins and their uses:** Below are the ports on the raspberry pi board and some of their uses. The ports may also be used for other purposes then listed below.

<table>
<thead>
<tr>
<th>Port</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB</td>
<td>Mainly used for pheriperals like keyboard, mouse and a wi-fi adapter. A powered USB hub can be connected and be expanded.</td>
</tr>
<tr>
<td>HDMI</td>
<td>This is the High Definition Multimedia Interface[HDMI] and is use to connect to a display unit like TV or monitor or sometime a projector.</td>
</tr>
<tr>
<td>STEREO AUDIO</td>
<td>Audio connections using a 35 mm jack.</td>
</tr>
</tbody>
</table>

This device is inexpensive but efficient and it consumes very low power. Raspberry Pi zero looks like average size of laptop or smart phones. This device runs on single core Broad Cam BCM2835 CPU. It can be clocked higher to 1 GHZ so it runs three times faster. In this raspberry Pi there is no in-built memory. Hence we are using SD card to store the data. SD card is used like a hard disc in a computer. The RAM memory size is about 512MB which makes the device to work faster. The raspberry Pi will connect to the internet through Wi-Fi router or modem.
C. LCD display 2x16: Liquid Crystal Display screen is an electronic module which is used in many applications. LCD 2x16 is the common module has ability to display 16 characters per line. The LCD are preferred than LED because the liquid crystal display screen are low in economical and easy to programme. The LCD has data and command register. The command register stores the instructions given to LCD like clearing the screen, controls the display etc. The data register stores the data to be displayed on LCD screen. This screen accepts the ASCII value of character.

D. Wi-Fi Router and cloud router: Wireless router is device which provides access to the internet. Based on the manufacture design the router may operate in local body area network or wireless LAN. Google cloud service will manages the cloud server. Generally the cloud computing is used through the internet. For example updating the status in any social media like facebook is through cloud computing process. The advantage of cloud computing is less cost, flexible to operate and provides secure connection. This cloud server will update their software automatically and easily manages the process. This cloud computing is reliable process even some applications may operates at off-line.

E. Light Emitting Diode: Two light emitting diodes are used in the heart monitoring system. LED light is used to know whether the heart rate is in normal or abnormal condition. When LED glows in Green color then heart rate is in normal condition. When LED glows in Red color then heart rate is in abnormal condition. These LED lights were used to monitor the patient whether they are in normal or abnormal condition. So we are using the LED in heart monitoring system

Simulation Results

The information measured by heart beat sensor is given to the ThingsSpeak server. This ThingsSpeak server is based on IoT platform. The data are uploaded into the cloud server through internet source. The channels will be created based on the stored data. This will also produce the graph to analyze the patient health. The ThingsSpeak server provides the facilities to use MATLAB in which the Math works are inbuilt. So there is no need to have Matlab license to work on Matlab. We should have an account to access the ThingsSpeak server.

### Table 1: Blood Sugar Level At Different Time

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/02/18</td>
<td>8:00 AM</td>
<td>100</td>
</tr>
<tr>
<td>11/02/18</td>
<td>11:30 AM</td>
<td>163</td>
</tr>
<tr>
<td>11/02/18</td>
<td>5:00 PM</td>
<td>130</td>
</tr>
<tr>
<td>11/02/18</td>
<td>9:30 PM</td>
<td>204</td>
</tr>
<tr>
<td>11/03/18</td>
<td>8:00 AM</td>
<td>130</td>
</tr>
<tr>
<td>11/03/18</td>
<td>11:30 AM</td>
<td>148</td>
</tr>
<tr>
<td>11/03/18</td>
<td>5:00 PM</td>
<td>120</td>
</tr>
<tr>
<td>11/03/18</td>
<td>9:30 PM</td>
<td>150</td>
</tr>
<tr>
<td>11/04/18</td>
<td>8:00 AM</td>
<td>92</td>
</tr>
<tr>
<td>11/04/18</td>
<td>9:30 PM</td>
<td>125</td>
</tr>
<tr>
<td>11/04/18</td>
<td>5:00 PM</td>
<td>133</td>
</tr>
<tr>
<td>11/04/18</td>
<td>9:30 PM</td>
<td>130</td>
</tr>
</tbody>
</table>

Before measuring the heart rate the sugar level in a body is measured through blood test. The blood test levels are measured for every month at times. This was explained in table 1. Based on the values in that table graph has been plotted. The sugar content in blood level is measured and presented in the form of graph.

### Table 2: Blood Pressure Level

<table>
<thead>
<tr>
<th>Date</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/08/18</td>
<td>120</td>
</tr>
<tr>
<td>18/08/18</td>
<td>130</td>
</tr>
<tr>
<td>25/08/18</td>
<td>90</td>
</tr>
<tr>
<td>01/09/18</td>
<td>85</td>
</tr>
<tr>
<td>08/09/18</td>
<td>170</td>
</tr>
</tbody>
</table>

After knowing the pressure level and sugar level in patient body cholesterol content in a blood should be examined. It is the important to measure the patients cholesterol level to know the heart problem. If the
cholesterol level is excess than normal range then patient have maximum possibility to have cardiac arrest. The level of cholesterol was given in table III. Fig.7 explains the cholesterol value in chart type.

<table>
<thead>
<tr>
<th>Date</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/08/18</td>
<td>50</td>
</tr>
<tr>
<td>18/08/18</td>
<td>90</td>
</tr>
<tr>
<td>25/08/18</td>
<td>20</td>
</tr>
<tr>
<td>01/09/18</td>
<td>45</td>
</tr>
<tr>
<td>08/09/18</td>
<td>62</td>
</tr>
<tr>
<td>15/09/18</td>
<td>30</td>
</tr>
<tr>
<td>22/09/18</td>
<td>40</td>
</tr>
<tr>
<td>29/09/18</td>
<td>50</td>
</tr>
<tr>
<td>06/10/18</td>
<td>70</td>
</tr>
</tbody>
</table>

Weight of a patient is examined throughout the process. The weight of a patient per time is calculated is given in fig.8 and their values are given in table IV.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>10</td>
<td>58</td>
</tr>
<tr>
<td>20</td>
<td>55</td>
</tr>
<tr>
<td>30</td>
<td>52</td>
</tr>
<tr>
<td>40</td>
<td>48</td>
</tr>
</tbody>
</table>

At last the heart rate of a patient is calculated. Above results are important to give treatment and this will be used for their future use. Then heart beat values should be noted and corresponding graph is plotted as shown in fig.9

<table>
<thead>
<tr>
<th>Date</th>
<th>Heart beat rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>30/09/18</td>
<td>80</td>
</tr>
<tr>
<td>02/10/18</td>
<td>100</td>
</tr>
<tr>
<td>0410/18</td>
<td>72</td>
</tr>
</tbody>
</table>

The heart beats of a patient is monitored by using heart beat sensor and the patient information are given to the cloud server. Then the coding is uploaded into the Raspberry Pi zero. The heart rate of a patient is analyzed and it provides the graph based on the data. The graph is plotted based on patients heart beat for some period of time.

**Conclusion**

In this paper we used a device Raspberry Pi to monitor the health of a patient. As prerequisite we have to measure the level of blood sugar, blood pressure, cholesterol, weight loss if it is normal then heart beats will also normal. This system is easy to implement and utilized in efficient way. So that doctor and patient can be communicated directly. We also implement this in hardware as a real time. This is the low cost device to monitor the patient health. If any abnormalities present in the patient this system will detect and send notification like SMS or mail to the doctor. If any additional information of a patient is needed for doctor reference then it can be retrieved from cloud server. So that doctor will give treatment directly without any intervention from their place. This paper is implemented in real time since it is not expansive and efficient.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** NIL

**Conflict of Interest:** Nil

**REFERENCES**


A Comparative Study of Body Mass Indices and Waist-Hip Ratios of Women in Relation to their Menstrual Status

Harmanpreet Kaur¹, Gurpreet Kaur², Surinder Kumar³

¹Associate Professor, Lovely Professional University, Phagwara; ²Ex Senior Research Associate, Department of Human Biology, Punjabi University, Patiala; ³Assistant Professor, Lovely Professional University, Phagwara

ABSTRACT

The present research investigation was undertaken to study the BMI and Waist-hip ratios in Punjabi women in relation to their menstrual status. The data were collected on 585 women belonging to middle socioeconomic status from Amritsar, Ludhiana and Patiala districts of Punjab. The women were ranging in age from 35 to 50 years. They were divided in to three groups: Premenopausal (N=216), Peri-menopausal (N=162) and Postmenopausal (N=207). The women who experience regular periods were designated as premenopausal. Whereas women who experience irregular periods at least for three months after the age of forty years were designated as peri-menopausal and those who had not experienced periods for atleast for more than one year were taken as menopausal. Various anthropometric measurements were taken by using standard techniques. The results of the study reveal that peri-menopausal women are significantly heavier, possess greater waist and hip girths than pre and postmenopausal ones. The former possess significantly greater body mass indices and waist hip ratios than the latter. 32.87% premenopausal women show high risk from life style diseases as assessed from their waist hip ratios; 68.52% perimenopausal women and 71.49% postmenopausal women show this risk. The results of the study indicate obesity and high risk of life style diseases during menopause.

Keywords: Premenopausal, postmenopausal and peri-menopausal, girths, body mass indices

Introduction

It is well known fact that with advancing age, women experience a large increase in body weight and fat. Various physiological events such as pregnancy, lactation and menopause increase fat storage in women. The fat gain and its distribution during menopause are entirely different from other events. During reproductive years, gynoid type of fat distribution is noticed among women (Rebufe-Scribe et al.¹). After the menopause, gynoid type of distribution changes in to android type i.e. greater amount of fat deposited on abdomen (Ley et al²; Kirchengast et al.³; Tchernof and Poehlman⁴). Various researchers also reported increase in abdominal adiposity during this phase (Folsom et al⁵; Seidell et al⁶; Despres and Lamarche⁷; Simkin-Silverman et al.⁸ and Garaulet et al.⁹). Keeping this in mind, the present research investigation is undertaken to enquire the difference in morphological parameters of pre, peri and post-menopausal Punjabi women.

Material and Method

The present research investigation has been undertaken to study obesity in Punjabi women in relation to their menstrual status. The data were collected on 585 women belonging to middle socioeconomic status from Amritsar, Ludhiana and Patiala districts of Punjab. The women were ranging in age from 35 to 50 years. They were divided in to three groups: Premenopausal (N=216), Peri-menopausal (N=162) and Postmenopausal (N=207). The women who experience regular periods were designated as premenopausal. Whereas women who experience irregular periods at least for three months after the age of forty years were designated as peri-menopausal and those who had not experienced periods for atleast for more than one year were taken as menopausal. Various anthropometric measurements like height, bodyweight, waist and hip girths were taken by using standard techniques of Lohman etal⁰. Using these measurements, Body mass index (BMI), waist to-hip ratio (WHR) were calculated. BMI was calculated as per Tanphaichitr et
After calculating BMI, which is an indicator of generalized obesity, women were classified into various categories by following the criteria of WHO (2000). The differences in variables among different groups were assessed with a 1-way ANOVA. When a significant difference was found with the ANOVA, a Post-hoc comparison was performed using the Turkey test.

Results and Discussion

Table 1: Comparison of anthropometric measurements of three groups of women

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Parameters</th>
<th>Pre-menopausal (n = 216)</th>
<th>Perimenopausal (n = 162)</th>
<th>Postmenopausal (n = 207)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>S.D</td>
<td>Mean</td>
</tr>
<tr>
<td>1.</td>
<td>Height (cm)</td>
<td>153.60</td>
<td>5.74</td>
<td>153.33</td>
</tr>
<tr>
<td>2.</td>
<td>Weight (kg)</td>
<td>61.99</td>
<td>12.51</td>
<td>68.55</td>
</tr>
<tr>
<td>3.</td>
<td>Waist (cm)</td>
<td>80.87</td>
<td>12.46</td>
<td>88.97</td>
</tr>
<tr>
<td>4.</td>
<td>Hip (cm)</td>
<td>95.7</td>
<td>10.77</td>
<td>100.73</td>
</tr>
<tr>
<td>5.</td>
<td>BMI</td>
<td>26.27</td>
<td>5.12</td>
<td>29.14</td>
</tr>
<tr>
<td>6.</td>
<td>WHR</td>
<td>0.84</td>
<td>0.07</td>
<td>0.88</td>
</tr>
</tbody>
</table>

Table 2: Post-hoc test between Pre-menopausal (1), Peri-menopausal (2), and Post-menopausal women (3)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Parameters</th>
<th>1vs2</th>
<th>2vs3</th>
<th>1vs3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Weight (kg)</td>
<td>4.93*</td>
<td>3.0*</td>
<td>2.10*</td>
</tr>
<tr>
<td>2.</td>
<td>Waist (cm)</td>
<td>6.57*</td>
<td>5.95*</td>
<td>0.99</td>
</tr>
<tr>
<td>3.</td>
<td>Hip (cm)</td>
<td>4.71*</td>
<td>2.75*</td>
<td>2.10*</td>
</tr>
<tr>
<td>4.</td>
<td>BMI</td>
<td>5.42*</td>
<td>3.48*</td>
<td>2.13*</td>
</tr>
<tr>
<td>5.</td>
<td>WHR</td>
<td>4.91*</td>
<td>6.37*</td>
<td>1.04</td>
</tr>
</tbody>
</table>

* Significant at 5% level

Table 3: Distribution of women according to classification of BMI (WHO, 2000)

<table>
<thead>
<tr>
<th>BMI</th>
<th>Pre-menopausal (n = 216)</th>
<th>Perimenopausal (n = 162)</th>
<th>Post-menopausal (n = 207)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category BMI</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Under weight &lt;18.50</td>
<td>13</td>
<td>6.02</td>
<td>3</td>
</tr>
<tr>
<td>Normal range 18.5-22.99</td>
<td>42</td>
<td>19.44</td>
<td>22</td>
</tr>
<tr>
<td>Overweight ≥23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At risk 23-24.99</td>
<td>25</td>
<td>11.57</td>
<td>12</td>
</tr>
<tr>
<td>Obese I 25-29.99</td>
<td>95</td>
<td>43.98</td>
<td>66</td>
</tr>
<tr>
<td>Obese II ≥30</td>
<td>41</td>
<td>18.98</td>
<td>59</td>
</tr>
</tbody>
</table>
Table 4: Disease risk assessed from waist-to-hip ratio (WHR) in Pre, Peri and Postmenopausal women as per Kissebah & Krakower12

<table>
<thead>
<tr>
<th>WHR range</th>
<th>Pre-menopausal (n = 216)</th>
<th>Peri-menopausal (n = 162)</th>
<th>Postmenopausal (n = 207)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Very low ≤0.80</td>
<td>73</td>
<td>33.79</td>
<td>23</td>
</tr>
<tr>
<td>Low 0.81-0.84</td>
<td>72</td>
<td>33.33</td>
<td>28</td>
</tr>
<tr>
<td>High &gt;0.85</td>
<td>71</td>
<td>32.87</td>
<td>111</td>
</tr>
</tbody>
</table>

Table 1 gives the comparison of anthropometric parameters of pre, peri and post-menopausal women. It has been observed from Table 1 that the mean value of stature is 153.60 cm in premenopausal women, 153.33 cm in peri-menopausal women and 153.05 cm in postmenopausal women, showing no significant difference in stature of these three groups of women. The value of F-ratio is found to be 0.53. The mean value of body weight is 68.55 kg in peri-menopausal women, 65.73 Kg. in post-menopausal and 61.99 Kg. in pre-menopausal. Thus, the results indicate that peri-menopausal women are significantly heavier, followed by Post-menopausal women and pre-menopausal ones. The perimenopausal women possess significantly greater body girths at the site of waist and hip than post-menopausal followed by premenopausal. Table 1 shows that the mean value of BMI is highest (29.14) in peri-menopausal women, followed by post-menopausal women (28), and 26.12 in pre-menopausal, indicating that former possess significantly greater BMI than latter. Table 1 show that the mean value of WHR is almost same in peri and postmenopausal women. However, both of them have significantly greater waist-hip ratios than pre-menopausal ones (Table 2). Table 3 gives the distribution of women according to classification of BMI (WHO, 2000). It has been observed that about 19.44% pre-menopausal, 13.58% peri-menopausal women and 0.48% post-menopausal women are found to be in normal weight category (BMI=18.5-22.99). 78.26% post-menopausal women 36.42% peri-menopausal and 21.60% pre-menopausal women are found to be in obese II category (BMI≥30). Thus, greater number of peri-menopausal women and post-menopausal are found to be obese as compared to pre-menopausal women. Table 4 gives the disease risk assessed from WHR as per (Kissebah & Krakower12). It has been noticed from Table that 33.79% of pre-menopausal women are found to be in very low disease risk category, as compared to 14.19% peri-menopausal and 10.14% post-menopausal women. Thus, the proportion of post-menopausal women in low disease risk category is found to be smallest as compared to peri and pre-menopausal women. It has been further observed that about 71.49% post-menopausal women are found in high risk category (WHR≥0.85), followed by 68.52% peri-menopausal and 32.87% pre-menopausal women, indicating higher percentage of peri and post menopausal women in high risk category than pre-menopausal.

Discussion

Both peri-menopausal and post-menopausal women are significantly heavier with greater body girths than pre-menopausal ones. Both peri-menopausal and post-menopausal women possess significantly greater values of BMI and WHR than pre-menopausal. Other studies also indicate higher BMI and WHR in postmenopausal women as compared to premenopausal women (Garaulet et al.9, Movsesyan et al.13 and Ozbey et al.14). Matthews et al.15 noticed that women undergoing surgical menopause and perimenopausal women have higher BMI than premenopausal women. Sonnenschein et al.16 observed that the WHR of middle aged women are influenced by menopausal status. Mean ratios change slightly from premenopause (0.73) to perimenopause (0.74) but increases significantly after menopause (0.78). Sultan et al.17 also reported WHR distribution was significantly different in post menopausal women from pre-menopausal ones, as most of the postmenopausal women showed android type of obesity with no subject having lower values of WHR. Bjorntorp18 stated that the increasing WHR with menopause has been linked to the possible role of estrogen in the regulation of visceral fat mass in women. Rebuffe-Scrive et al.19 also commented that the redistribution of body fat during and after menopause may be attributed to the effects of estrogen deficiency on adipocyte metabolism leading to differential fat patterning.

It has been observed that both peri-menopausal and post-menopausal women are overweight and obese as...
compared to pre-menopausal women. Similar results were reported by Tapadar et al.\textsuperscript{20}. They reported an increased tendency of overweight in Bengali menopausal women (73%) from pre-menopausal women (60%). They found maximum weight gain occurs through the peri-menopausal years. Simkin – Silverman et al.\textsuperscript{21} studied menopausal related weight gain, increased waist circumference and its effect on cardiovascular health implications for older women aged 44 to 50 years. They commented that in healthy women, weight gain and increased waist circumference during peri- to post-menopausal period can be prevented with long term lifestyle dietary and physical activity intervention.

The results of present study indicate that both peri-menopausal and post-menopausal women are at higher risk of disease than pre menopausal. Similarly Monisha and colleagues\textsuperscript{23} investigated 600 post-menopausal women ranging in age from 50 to 60 years belonging to upper and lower socioeconomic status. They observed that as the year after menopause progresses, the proportion of women in high risk category also increases in both the groups under study. Tapadar et al.\textsuperscript{20} suggested that the intervention of reducing weight should begin early. They further observed that impaired glucose tolerance produces postmenopausal metabolic syndrome, with subsequent increase in risk of coronary heart disease. Zhou\textsuperscript{22} observed that there were higher risks of developing hypertension, dyslipidemia and diabetes with increasing body mass index and waist girth.

**Ethical Clearance:** Taken from Council of Scientific and Industrial Research (CSIR), New Delhi committee

**Source of Funding:** Financial support from the Council of Scientific and Industrial Research (CSIR), New Delhi is gratefully acknowledged.

**Conflict of Interest:** Nil

**REFERENCES**


13. Movsesyan L, Tanko L.B, Larsen P.J, Christiansen C, Svendsen O.L. Variations in percentage of


Segmentation and Vein Extraction in Sclera for Human Identification

Dhamodaran M¹, Tharani T²
¹Professor; ²PG scholar, Department of ECE, M. Kumarasamy College of Engineering, Karur, Tamil Nadu

ABSTRACT

In this paper the main contribution is statistical approaches based image segmentation method, and is able to pointout the circular pupil and sclera area, occluding eyelashes and eyelids, and reflections by a technique Image cropping. Proposed segmentation method is followed with investigation of five feature extraction techniques, viz. Statistical approaches, Glare Area Detection, Wavelet transforms, Lifting wavelet transforms and finally Contour let transform to extract features and to encode and decode the particular parameters of the iris into a bit-wise biometric template. A comparative analysis is done for these techniques with the proposed segmentation method. The green channel extraction measure and Separable Power was employed for classification, finally for classification adopting train iris image deviated output image methods is imported out. The proposed iris recognition method that uses Glare Area Detection and database identification for feature extraction performed with a near-perfect identification in different sclera pictures. This proposed system demonstrates that combination of proposed segmentation approach and feature extraction method in this work helps to improve overall performance and significant increase in the sclera recognition accuracy. The algorithm is robust for noisy conditions such as errors, elliptical pupils, excess eyelash occlusion errors and bad contrast.

Keywords: Sclera identification, sclera deviation, feature extraction, pupil descriptor, Gabour filter.

Introduction

Image processing is a methodology which is capable of converting a picture to discrete function and it performs certain functions on picture, so as to achieve an evaporated picture or to extract some vital details from it. It is similar to DSP. In image processing, input is an image (may be a video frame or a photograph in any format) and the conclusion may be a picture or the functionalities of the input pictures. System usually considers a picture as a 2D signal, while processing. It is one among the emerging technologies, with its branches of application wide spread into several domains of business. Image processing is a core research area in engineering and it also acts as a thrust area in other disciplines of computer science. Researchers are in need of image processing; as it offers real time applications and the results derived from image processing techniques are also made available to the hands of its user.

Figure 1: Enhanced close-up of sclera surface

This is an important matter in the research field of medical imaging and a lot of algorithms have been suggested to solve it. But unfortunately it is still unsolved due to the low efficiency, accuracy, applicability and robustness of present algorithms. Figure 1 explains the enhanced view of iris images. So in this work we proposed semi-automatic sclera detection and classification framework from iris region segmentation to the tissue classification. By adaptive training, the system can obtain the properties of iris after the first detection and classification and then separate the sclera in the subsequent input images examinations automatically.
Figure 2: Overview of typical sclera recognition

Basic flow diagram of sclera detection and classification is as shown in figure 2. The diagram consists of four modules: picture enhancement, image segmentation, feature extraction, and classification.

- **Image Segmentation**
- **Feature extraction**
- **Classification**

This research focusing on analysing the sclera human identification with its motivation, objective and its contribution. Section 2 provides the detail description of various research activities contributed towards the attack detection and avoidance or prevention. Similarly, section 3 provides the proposed system and its solution. Then, research methodology is considered here to analyse the operation of standards under section IV. Finally, feature and conclusion is carried out in under section V.

**Literature Review**

Segmentation for sclera is described by various researchers. Likewise, John Daugman et al.\(^1\) proposed a concept of super pixel classification based optic disc and optic cup. In early stages, the sclera leads in serious effects and faces lot of difficulties for treatment, Nicola Ritter et al.\(^2\). They discussed about the bed fort and its effects on various people variation between age, sex and different date. As per the survey carried out by Ali Chekima et al.\(^3\), prevalence of sclera matched varies with the region and race. It advised that there is no specific cut-off point for intraocular pressure (IOP) which sclera segmentation creates, although expanding IOP was a critical hazard factor for sclera based matching.

Wildes et al.\(^3\) mentioned that primary hazard components of sclera are hoisted IOP applied by watery diversion, family history of sclera (genetic), astigmatism or partial blindness, sclera in the other eye, retinal separation, injury to the eye, diabetes, pigmentary scattering disorder, slender points, low fundamental circulatory strain, headache migraines or visual headaches, Raynaud’s disorder, blood thickening, irregular visual field tests, undesirable optic nerve, corneal dystrophy and pseudo shedding.

Sanchez-Avila et al.\(^4\) stated that sclera effects on aged 40 years or older people as per the survey around TamilNadu, southern part of India. They conducted the survey based on the aravind Comprehensive Eye camp around rural population in the state. India is the second most populated nation among the world. The effect of visual failure and visual deficiency from sclera match lagging is in all likelihood expensive. In spite of its general wellbeing essentialness, there has been constrained information accessible on the pervasiveness of sclera and conceivable hazard factors for sclera effect in India. Past populace based investigations from India have announced the predominance of iris problems in urban populaces. There has been no investigating on the pervasiveness of iris matching in provincial populaces from India. Also, in these earlier examinations, perimetry was restricted to the individuals who satisfied certain conditions like IOP or brain plate measuring.

Sanchez-Avila et al.\(^4\) portrayed diabetic sclera is as an endless disease, caused by inconveniences of diabetes mellitus and establish the essential driver of visual impairment among individuals of working age in created nations. As diabetic retinopathy is difficult sickness, Mira et al.\(^6\), recommended that laser photocoagulation can forestall significant vision misfortune if identified in beginning times. As doctor-patients can’t manifestations until their visual misfortune creates, diabetic patients require a yearly MRI-fundus examination.
By Wen-Shiung et al., (1997) described the use of Expectation Maximization. A. P. Dempster et al.\(^7\) algorithm to estimate the respective distribution parameters. Likewise, most of the researchers focused on applying the retinal image and processed for diagnosing. It minimizes the concept of complexity and helps doctor to predict the disease in early stage. There are numerous approaches to available for segmentation A. Ross et al.\(^8\) once a segmented image has been acquired, the iris information is unwrapped by a conversion from the Cartesian to the polar domain. The use of this coordinate system normalizes the iris into information that can be easily compared to other irises. Textural information, used in template generation, is extracted from this image by applying a set of 2D Gabor filters and recording the phase response of each of the filters. The phase information of the iris pattern is quantized in terms of the complex plane quadrant associated with the Gabor wavelet response.

In early stages, the classical segmentation algorithms like thresholding, edge detection and region growing techniques are resulted with some limitations. It is difficult to find the concept of boundary detection correctly because it gets varied during the edge detection. Hence, the smoothness is mismatched while segmenting the image. Hence, various researchers focused on applying the concept of segmentation retinal Local entropy thresholding based fast retinal vessels segmentation Mihran Tuceryan et al.\(^9\), active contour model based on extended feature projection Ann A. Jarjes et al., and Nitin K. Mahadeo et al.\(^10\) adaptive threshold based algorithm (Issac et al., 2015), Active contours techniques for automatic detection of glaucoma (Kumar et al., 2012) etc.

Proposed System

Proposed method consists of two phases testing phase and training phase. In training phase, initially pre-processing of input images is done. Features of pre-processed images are extracted. These features are used to train the classifier and resulting coefficients are stored in knowledge base. In testing phase multi sequence images are taken and registration of each image is done before pre-processing. After pre-processing, region of interest is manually selected and feature is extracted as in training phase. Output of which is compared with trained co-efficient stored in knowledge base using a classifier to get segmented output. Decision based on type of sclera is also obtained.

There are two major types of image classification methods. One is unsupervised which is programmed by software and supervised which is known as human-guided classification. Unsupervised classification is the measure of the software based parameters analysis without any external affair or from the sample use to guide classifier. Here the classifier uses methods to determine which parameters or pixels of an image are similar and group them into particular classes. In this type of classifier the user can provide the classification algorithms as inbuilt software which will be used for grouping the upcoming images into the particular classes.

The second supervised classification uses the selected input sample pixels/images which represent the specific classes and then guide the imaging software to use these trained samples for comparing with the upcoming input. In this training phase the inputs are selected based on the victim’s image/pixels parameters for comparing with the input pixel in testing phase. The developer can set the similarity measurement for how other pixels are taken into the same class. These categories are often set depending on the spatial characteristics of the training phase. Many have developed software for classification algorithm with supervised and unsupervised classification processes to get the final output in terms of specific classes.

Figure 3: Proposed system for sclera recognition
The architecture of the proposed methodology is as depicted in Figure 3. The three different iris sequences are considered as the input images for further processing. The proposed sclera detection system includes two process training and testing process. In training process database images are trained, each tumor segmented regions are pre-processed and texture features like green channel extraction, glare area detection and gabour feature extraction are extracted and the resulted feature vector are stored in the database for matching with test images. Next part is testing process, build up with five different modules namely registration where three iris sequence images are fused and registered using edge based sclera mapping method. Each registered image is enhanced and noise is eliminated using mean filter and RGB to gray conversion. Then for identifying the sclera region in the registered image is carried by applying the segmentation method. As the next module each segmented sclera region needs to verify the presence or absence of sclera in each iris image, for this a convenient form of matching sclera neural network for the purpose of classification is build for identification of the iris. Here the classifier is initially trained using many iris images present in the database and which is carried out in the training phase, after that few iris images are used for testing the trained sclera and classify the eye image as matched or not.

**Result and Discussions**

The proposed implementation follows the Registration, Pre-Processing, Segmentation of iris region, Feature Extraction and Classifier processes. The registration procedure includes similarity measurement between two or more image captured under same scene but at varying time and change of viewpoints.

![Figure 4: (a) input sclera image (b) Grey scale image](image)

Two types of images are used in the registration process source and target image, single Sclera of eye image is considered as source image as shown in Figure 4(a), which is also considered as reference image for registration process and the image which is to be registered is considered as target converted grey image as shown in Figure 4(b).

![Figure 5: (a) Glare image (b) Threshold iris image (c) iris segmentation image](image)

The system mainly segments and classifies the iris image into: matched or unmatched. The input images as shown in Figure 5 is passed to the proposed system after processing steps, the system classifies the iris image into two types: the iris detection or iris not matched.

![Figure 6: (a) Sclera saturation image (b) Sclera threshold image](image)

As the first step the input image is registered Figure 5, second step before segmentation noise has been removed using average filters and then segmented using region-growing algorithm as shown in Figure 6 with the segmented part is bounded by the blue color border. Segmented region is as shown in Figure 7. After extracting the feature from this region using data gabour classifier the brain image is classified as iris detection or not. In Figure 7 shows the classification result as IRIS detection which is confirmed as a matched displayed the result matched person name.

The experiment is carried out for different input sample images to verify and validation the iris detection and classification. Figure 7 carried for different set of images, the first row represents the registered image for selected source and destination images, next step will be segmentation for brain tumor region detection, as shown in the second column of Figure 7.
Finally the classification result is displayed using message box as shown in Figure 8, with samples; image is classified as key images of user (authorized or not) and authentication person name.

**Conclusion**

Sclera detection is very sensitive and difficult task and helps in directing the radiologist for human eye iris detection. In this work, an effectiveness of two texture analysis method is used for identifying the tissue region of sclera identification. The proposed approach implements a novel procedure which uses a combination of Glare area Detection and matching sclera and database texture feature based classifier for the detection of eye sclera from iris scan image. The combination of Glare area Detection and matching sclera and database texture feature based classifier hybrid features vector performed well in discriminating between matched and unmatched sclera also for classification of a multilayer perceptron classifier is used and achieved the better classification accuracy. The proposed method experiments are carried out with this procedure on several images. The proposed method extracts only 23 features from the segmented image using Glare area Detection and matching sclera and database, using this texture feature the classification of iris became ease. The complexity reduced due to less number of feature used for the classification.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**REFERENCES**


Royal Jelly and Honey Ameliorates Cisplatin Induced Alterations in Biomarker Levels of Oxidative Stress in Kidney of Rat

Waykar Bhalchandra¹, Yahya Ali Alqadhi²
¹Professor, ²Ph. D Researcher; Department of Zoology, Faculty of Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra, India

ABSTRACT

Background: Cisplatin is one of the cytotoxic agents in the treatment of cancer and has side effects on kidney function. Honey and royal jelly are both natural antioxidant. Objective: This study investigated the ameliorative role of honey and royal jelly against cisplatin induced biomarker levels of oxidative stress in rat kidney by measuring tissue biochemical and antioxidant parameters.

Method: Male wistar albino rats of approximate same age and weight were randomly divided into four groups. Group I: control group was given 0.9% saline. Group II; cisplatin (7mg/kg/day) was injected intraperitoneally for 15 days. Group III; honey with royal jelly (500 mg/kg/day of honey and 100mg/kg/day of royal jelly) was fed orally daily for 15 days. Group VI; cisplatin (7mg/kg/day) was injected and honey with royal jelly (500mg/kg/day of honey and 100mg/kg/day of royal jelly) were fed orally daily for 15 days.

Results: Cisplatin caused a significant increase in the level of malondialdehyde (MDA) in kidney tissue. The level of glutathione (GSH) and activity of catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx) were significantly decreased in (G,II). Supplementation of honey and royal jelly to rat (G,III) caused non-significant decreased in the level of malondialdehyde (MDA) in kidney tissue. In contrast, the level of glutathione (GSH) and activity of catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (G,Px) activities were non-significantly increased compare to control. In (G, IV), honey and royal jelly in cisplatin association, there was improvement in biomarker levels of oxidative stress.

Conclusion: Oral administration of honey and royal jelly ameliorated the toxic effects and provided substantial protection against cisplatin-induced nephrotoxicity.

Keywords: Antioxidants, rat, kidney, cisplatin, honey, royal jelly, oxidative stress.

Introduction

Cisplatin is anticancer chemotherapy drug used against several human cancers¹. However, it has several side effects including hepatotoxicity, nephrotoxicity etc. Oxidative stress has been implicated in the pathogenesis of kidney injury induced by cisplatin through increasing reactive oxygen species (ROS) ². ROS particularly superoxide radical (O₂⁻) and hydroxyl radical (OH) play the important role in cisplatin induced acute renal failure by reducing renal blood flow and inducing tubular damage associated with increased renal contents of MDA³. Moreover, apoptosis also plays key role in cisplatin-induced renal cell injury⁴. So, searching for method to prevent cisplatin-induced nephrotoxicity constitutes an active area of investigation. Therefore, it is reasonable to suppose that the use of antioxidant defence of kidney tissue by exogenous antioxidants effects should be a strategy to preserve the kidney from the oxidative damage⁵.

The science of nutrition has been advanced significantly based on the greater understanding of physiological and genetic mechanisms by which diet and individual food components influence health and disease. Diet controls and modulate human body physiology and appropriately contribute in the maintenance of good health or homeostasis necessary to reduce the risk of many chronic diseases. Zhang, et al⁶ stated that natural antioxidants reduces side effects as well as enhance
anticancer activities of antitumor drugs. Although various experimental studies indicated that royal jelly and honey have highly efficient antioxidant and has the free radical scavenging capacity against nephrotoxicity induced by cisplatin.

The aim of the present study was to investigate the protective and ameliorative effect of combined administration of honey and royal jelly against cisplatin induced changes in biomarker levels of oxidative stress in kidney of rat.

Materials and Method

Animals: Healthy male Wister albino rats weighed 200-250gm (10-12 week age) were got from the animal house of R. C. Patel Institute of Pharmaceutical Education and Research, Shirpur-India. All the experimental procedures were carried out according to the guidelines of CPCSEA and the experimental protocol approved by the Institutional Animal Ethics Committee (IAEC) of RCPiPER, Shirpur (Reg No- 651/PO/ReBi/S/02/ CPCSEA).

Housing Conditions: The rats were housed in standard plastic cages. The bedding material of the cages was changed every day. Maximum of 3 rats were housed per polypropylene cage having a size of 32 X 11 cm with stainless steel grill top mesh having facility for holding food palate and a water bottle. The rats were allowed to free access to diet and water throughout the experimental period. All animals were housed in an air conditioned room at temperature range between 22 -25°C, relative humidity in between 30%-60%.

Acclimatization: Selected rats were divided randomly into four groups, containing 6 rats in each group and allowed to acclimatize to laboratory conditions for 7 days prior to experimentation.

Water: Water processed by reverse osmosis and UV light was supplied ad libitum to the rats.

Chemicals: Cisplatin was purchased from Cipla Ltd Company- Goa-India. Bee honey and royal jelly was collected directly from the Apis mellifera colonies located in the University campus. Food pallets were purchased from Nutrivet Life Sciences, Pune, Maharashtra, India. All other chemicals used in the estimations were of analytical grade.

Preparation of Royal Jelly and Honey: 500mg of honey and 100mg of royal jelly were dissolved in distilled water and administered through an intragastric tube through the mouth. The doses were weighed on digital scales where each dose relies on the relevant animal’s weight, in which every single gram of the experimental rat should receive 0.5mg of honey and 0.1mg of royal jelly.

Experimental Design: For the study, 24 adult male Wister albino rats of 10-12 week age and with 200-250g weight divided randomly into 4 groups, each group contained 6 rats (n = 6) and were treated for 15 days as below:

Group I (Control): 0.9% (10ml/kg/day) saline solution was administered for 15 days.

Group II (Cisplatin): Cisplatin (7mg/kg/day) intraperitoneal injection for 15 days

Group III (Honey+Royal jelly): Honey (500mg/kg/day) + Royal jelly (100mg/kg/day) orally administered for 15 days

Group IV (Cisplatin+Honey+Royal jelly): 7mg/kg/day of cisplatin injected intraperitoneally while honey (500mg/kg/day) and royal jelly (100mg/kg/day) were orally fed through an intragastric tube for 15 days.

Estimation of antioxidant enzyme levels: At the end of experiment animals were deprived of food overnight and sacrificed by cervical decapitation for estimation of antioxidant enzyme in kidney tissue like level of malondialdehyde (MDA), glutathione (GSH) and activity of catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx).

Preparation of kidney homogenate: The kidney were carefully removed, weighed and excised rinsed in ice-cold normal saline, followed by rinsing with 0.15 M Tris-HCl (pH 7.4) to remove the blood. Then, the kidney was sliced separately into pieces and prepare a 10% w/v homogenized with buffer containing 0.25M sucrose and 0.1M Tris HCl buffer (pH 7.4). The homogenate was centrifuged at 3000 rpm for 20 min at 0°C in cold centrifuge. The supernatant was separated and used for analysis of various antioxidant enzymes.

Assay of antioxidant enzyme: The levels of lipid peroxidation (LPO) in tissues were estimated by the method of Okhawa. Superoxide dismutase (SOD) was assayed by the method of Kono. The activity of catalase
Glutathione peroxidase (GPx) was estimated by the method of Rotruck\textsuperscript{15} Reduced glutathione (GSH) was estimated by the method of Sharma\textsuperscript{16}

**Statistical Analysis**

All data were expressed as mean ± S.D. and statistically analysed using Graph Pad Prism 7 for Windows (Prism Inc, Chicago, IL, USA). Statistical significance of differences among different study groups was evaluated by one-way analysis of variance (ANOVA) followed by Bonferroni’s multiple comparisons test as a post hoc test. P value of 0.05 or less was taken as a criterion for a statistically significant difference.

**Results**

Effect of administration of cisplatin, honey and royal jelly, and the combined administration of cisplatin with honey and royal jelly on biomarker levels of oxidative stress in rats were evaluated in comparison with control and obtained results were summarized in table 1.

The results demonstrated that cisplatin administrated to rats, exhibited significant increase in the level of malondialdehyde (MDA), the percentage increase was 203.44 % compare to control. In contrast, the level of glutathione (GSH) and activity of catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx) were significantly decreased by 48.77%, 31.91 %, 31.7 % and 79.47% respectively, compare to control.

Oral supplementation of honey and royal jelly to rat, caused non-significant decrease in the level of malondialdehyde (MDA), percentage decreased was 10.34 % compare to control. While, the level of glutathione (GSH) and activity of catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx) were non-significantly increased by 3.14 %, 6.3 %, 2.4 % and 5.26 % respectively, compare to control.

Combined administration of cisplatin along with honey and royal jelly, caused significant decrease in the level of malondialdehyde (MDA) of experimental rats and the parentage decrease was 30.68 %, compare to cisplatin administered rats. While, the level of glutathione (GSH) and activity of catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx) were significantly increased compare to animal treated with cisplatin. The percentage increased were 56.99%, 31.25%, 28.57% and 258.97% respectively.

**Table 1: Effect of administration of cisplatin, royal jelly and honey and combined administration of cisplatin with honey and royal jelly on biomarker levels of oxidative stress in kidney of rat**

<table>
<thead>
<tr>
<th>Biochemical parameter</th>
<th>(G.I) Control</th>
<th>(G.II) Cisplatin</th>
<th>(G.III) Honey and royal jelly</th>
<th>(G.IV) Cisplatin with Honey and royal jelly</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDA (µg/mg of protein)</td>
<td>29 ± 0.97</td>
<td>88 ± 2.5****a # (203.44 %)</td>
<td>26 ± 2.8NSA # (-10.34 %)</td>
<td>61 ± 2.6****b w (-30.68 %)</td>
</tr>
<tr>
<td>GSH (µg/mg of protein)</td>
<td>5.72 ± 0.22</td>
<td>2.93 ± 0.34****a # (-48.77%)</td>
<td>5.9 ± 0.59NSA # (+3.14 %)</td>
<td>4.6 ± 0.28**b w (+56.99%)</td>
</tr>
<tr>
<td>Catalase (U/mg of protein)</td>
<td>9.4 ± 0.45</td>
<td>6.4 ± 1.3*a # (-31.91 %)</td>
<td>10 ± 0.53 NSA # (+6.3 %)</td>
<td>8.4 ± 0.75*b w (+31.25%)</td>
</tr>
<tr>
<td>SOD (U/mg of protein)</td>
<td>41 ± 2.2</td>
<td>28 ± 1.3***a # (-31.7 %)</td>
<td>42 ± 2.5 NSA # (+2.4 %)</td>
<td>36 ± 1.1*b w (+28.57%)</td>
</tr>
<tr>
<td>GPX (µg/mg of protein)</td>
<td>19 ± 1.1</td>
<td>3.9 ± 0.61****a # (-79.47%)</td>
<td>20 ± 1.9 NSA # (+5.26 %)</td>
<td>14 ± 1.3***b w (+258.97)</td>
</tr>
</tbody>
</table>

1. ± indicate S.D. of three observations
2. # (+) or (-) indicate percent variation over respective control (G, I) rats
3. w (+) or (-) indicate percent variation over cisplatin injected (G, II) rats
4. Values are significant at *P<0.001, **P<0.01, ***P<0.05, NS –Non significant
5. a = P<0.001, **P<0.01, ***P<0.05 values compared with respective control rats
6. b = P<0.001, **P<0.01, ***P<0.05 values compared with respective cisplatin injected rats
Discussion

The obtained results demonstrated that cisplatin administrated rats, exhibited significant increase in the level of malondialdehyde (MDA) in kidney tissues. This was attributed to cisplatin-induced increase in free radical generation and decrease in lipid peroxidation protecting enzymes. Cisplatin induces the generation of free radicals such as hydrogen peroxide, superoxide anions and hydroxyl radicals. The hydroxyl radical is capable of abstracting a hydrogen atom from polysaturated fatty acids in membrane lipids to initiate lipid peroxidation. These radicals can evoke extensive tissue damage, reacting with macromolecules, such as membrane lipids, proteins and nucleic acids. Moreover, continuous exposure to free radicals causes lipid peroxidation in cells and cell membranes enriched with polysaturated fatty acids (PUPA) decompose to yield highly reactive free radicals and malondialdehyde (MDA). Similar results were reported by many authors.

The obtained results demonstrated that cisplatin administrated rats, caused significant decrease in the level of glutathione (GSH) in kidney tissues. This was attributed to cisplatin may bind with the sulf-hydryl group of GSH and may substantially decrease the availability of GSH to scavenge free reactive oxygen metabolites. The cisplatin complex may also disrupt in lipid peroxidation and mitochondrial damage. Several studies demonstrated that cisplatin induced acute nephrotoxicity is mediated by depletion of renal GSH and by impaired activity of GPx as well as an increase in renal lipid peroxidation. Nakano, and Gemba, reported that administration of cisplatin to rat resulted in depletion of glutathione and subsequent potential of lipid peroxidation in liver and kidney cortical slices. The reduced glutathione was reported to protect cells from cytotoxic damage by many toxic compounds and it is generally known as a potent factor in the control of lipid peroxidation. The role of GSH depletion with the consequent lipid peroxidation in cisplatin-induced nephrotoxicity and hepatotoxicity was confirmed by Anderson, et al. Moreover, depletion of glutathione a potent free radical scavenger, may contribute to cisplatin-induced lipid peroxidation.

The decrease in the activities of the antioxidants enzymes were attributed to oxidative stress injury by cisplatin. Cisplatin induces glucose-6-phosphate dehydrogenase and hexokinase activity and stimulates ROS production by damaging mitochondria, which increase free radical production and decrease antioxidant production.

Combined administration of cisplatin along with honey and royal jelly, leads to significant decrease in the level of malondialdehyde (MDA) in kidney tissue compare to animal treated with cisplatin. This was attributed to the antioxidant properties of honey and royal jelly which protect maintain kidney tissues in normal range. In contrast, the level of glutathione (GSH) and activity of catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx) were significantly increased compare to animal treated with cisplatin. However, the elevated GSH level and activities of GSH-Px, CAT, GST and SOD enzymes in the cisplatin plus royal jelly and honey group implied a decrease in the number of free radicals after cisplatin administration and reflected that these enzymes played important roles in scavenging of free radical.

Royal jelly and honey may be used as functional food because of their naturally high antioxidant potential. It contains many important compounds with biological activity such as free amino acids, amino acids such as aspartic acid, cysteine, cystine, tyrosine, glycine, lysine, leucine, valine, and isoleucine. As indicated by previous researchers, the antioxidant effect of royal jelly may be related to its free amino acid content. The royal jelly has a highly efficient antioxidant and has the free radical scavenging capacity. Honey is a natural antioxidant, which may contain flavonoids, ascorbic acid, tocopherols, catalase and phenolic compounds all of which work together to provide a synergistic antioxidant effect, scavenging and eliminating free radicals.

The exogenously administered l-arginine may decrease the oxidative stress in the kidney. Cystine and cysteine take part in the synthesis of GSH, an effective cellular antioxidant. GSH breaks down reactive oxygen species and detoxifies carcinogens, both directly and by antioxidant enzymes with which it reacts. In this study, royal jelly and honey application following that of cisplatin was found to prevent rapidly formed kidney
injury. Royal jelly was determined to include 57-kDA glycoprotein stimulating tissue growth. The reason why royal jelly and honey application along with cisplatin decreased cisplatin induced nephrotoxicity could be related to the fact that it contains kidney cells-stimulating substance and glutathione precursor cystine and cysteine having important role in the kidney detoxication system as well as free amino acids such as glycine, aspartic acid, valine. Many investigators reported that royal jelly and honey has a protective role against many drugs on biomarker levels of oxidative stress in kidney of rat.

**Conclusion**

It is concluded that the combined oral supplementation of honey and royal jelly protected and ameliorated the alterations in biomarker levels of oxidative stress in kidney induced by cisplatin in rats. Therefore, the combination of honey and royal jelly may be used as therapeutic agents to prevent kidney damage caused by cisplatin induced oxidative stress because honey and royal jelly contain antioxidants, lipid peroxidation inhibitors and anti-inflammatory effects.

**Acknowledgments**

The authors would like to express their gratitude to the C R. C. Patel Institute of Pharmaceutical Education and Research, Shirpur-India for providing the animals and facility.

**Ethical Clearance:** Taken from the committee

**Financial Support and Sponsorship:** Self-financing

**Conflict of Interest:** The authors declare that there is no conflict of interest

**REFERENCES**


Relationship of the Selected Kinematic Variables with Movement Phases of Two Different Types of Jerk of Weightlifting

Sunil Kumar¹, Kiran¹

¹Assistant Professor, School of Physical Education, Lovely Professional University, Punjab

ABSTRACT

The purpose of the study is to find out the relation of selected kinematic variables in movement phases of two different techniques of jerk. Five male inter-university participants in weight lifting of 18 to 25 years of age, who had participated for Lakshmirai National Institute of physical education, Gwalior, were selected as subjects for this study. The selected variable was Angular kinematic variables (drive to jerk, getting under barbell) at various joint and Linear kinematic variables was height of Centre of gravity of the subjects during drive to jerk and getting under the barbell. The obtained data were analyzed by using pearson’s product moment correlation. All the data were analyzed by statistical package for Social Science (SPSS) version 20. For testing the level of significance was set at 0.05. The results have exhibited that the obtained value of coefficient of correlation in all angular and linear kinematic variables at all the selected moments have shown insignificant relationship with the time of drop under in split jerk in weight lifting.

Keywords: Kinematic variables, Jerk, Biomechanics, SPSS and Weightlifting.

Introduction

Biomechanics is most helpful in improving the performance in sports performance or activities where technique is the dominant factor rather than physical structure or physiological capacity. Since biomechanics is essentially the science of movement technique² ⁹. Biomechanics research and sports techniques sometimes tend to lack behind the changes that are naturally occurring in sports⁵. Athletes and coaches experiment with new technique all the times. Students of biomechanics may be surprised to find that there are often limited biomechanical studies on many techniques in many popular sports⁴. The vast number of techniques, their variation and their high rates of changes and innovation tends to out distance biomechanics research resources.

The increasing ages, upcoming researches and studies has changed many things and made great improvement in the society. Science has created miracle which has let machinery, computers etc. these scientific researches help the working of the man and save energy of the individual. But many things do not change including human’s subject of interest and tendency to fight for success. Human being especially men have an interest in strength and also testing his strength. In ancient days people used to train to improve their strength to enlist in the armed forces. It started in China where emperors used to make some of his good men to work on strength and at the end of Chou dynasty he would test them to be entered into the army. This is the first proof of strength training. In those days, the 6th century BC was known as age of strength. Competitions were held of weightlifting but of different form with lifting huge stones. Later after the era of lifting huge stones came the age of lifting halters, sand bags etc. again further this form went on changing. In 19th century the real weight lifting was born in central Europe. Many strong men were born and created different records. Weightlifting competitions were held every two months. The first international weightlifting competition was held in London in March, 1891. Competitors from only four countries namely Germany, Italy, Belgium and Britain participated in competition. As stated earlier weightlifting was performed with huge stones, halters and sand bags later it was developed to dumbbells which were bell shaped⁶.

The role that sports biomechanics can play is becoming more widely understood in sports community and the demand for service increasing, research in
sports biomechanics will have to consider carefully how much time they can denote to the provision of scientific services without impairing their performance as scholar researcher, to avoid the problems inherent in this situation, it may be necessary to develop programs of study for the training of techniques in sports biomechanics, technicians who can provide the kind of services sought by sporting bodies.

The role of biomechanics in attaining high performance cannot be overlooked, since it is the only scientific field which helps to identify the faults in performing technique very precisely. There are basically two methods by which motor skills can be analyzed. They are the qualitative and quantitative methods, high speed moving film for exactness has been used intensively to examine in great details of the movements of the body which occurs too fast for the human eye to detect. In many ways of the elite sports training and research institute around the world, force applied during high caliber sporting events, while analysis tests have been done much to improve our understanding of movements and the performance of the elite athletes, the analysis task faced by the coach are predominantly qualitative in nature.

Hypothesis: Based on expert opinion, Scholar’s own understanding of the problem & research findings-

- It was hypothesized that there will be significant difference in the selected linear kinematic variable with the techniques of jerk.
- It was hypothesized that there will be significant difference in the selected angular kinematic variable with the techniques of jerk.

Significance of the Study: In the field of sports & games every sportsman tries to do all that is within his capacity to enhance performance. It is not enough to put in maximum effort but more important is the fact that minimum effort is used efficiently so as to gain the maximum output possible from the same effort.

- The study may serve as a biomechanical model for improving the crucial drop-under phase enabling teachers of physical education & coaches to enhance the performance of trainees.
- The study may provide knowledge to the students regarding the procedure related to the analysis of various angles to be found out in human movement.
- The study may also help the coaches to analyze the technical faults.

- The study may also help the weight
- Lifters to understand & analyze their technique & further make necessary corrections to have better performance.

Selection of subjects: Five male inter-university participants in weight lifting of 18 to 25 years of age, who had participated for Lakshmibai National Institute of physical education, Gwalior, were selected as subjects for this study. Since the subjects had been undergoing training for considerable period, therefore it was considered that they possess good level of technique. The purpose of the study was explained to all the subjects and urged to put their best during each trial and had participated willingly.

Statistical Technique Employed: To find out the relationship of selected biomechanical variables with movement phases in different techniques of jerk was calculated by using person’s product moment correlation. All the data were analyzed by statistical package for Social Science (SPSS) VERSION 20. For testing the level of significance was set at 0.05.

Criterion Measures: The criterion measures for the study were-

- The angles at selected joints were recorded in nearest degree.
- Height of Centre of gravity was measured in cm.

Reliability of data: To obtain reliable measurements, the instruments which were used for the purpose of the present study, namely the cameras, steel tape, the bar, the stop watch, the weight plates and geometric instruments were all standard instruments as available in the Lakshmibai National Institute of Physical Education, Gwalior and their reliability was insured by the manufacturers. All the measurements pertaining to the biomechanical variables were taken by the scholar under the expert’s guidance so the data collected for the study were considered reliable.

Filming Protocol & Analysis of the Film: The digital photography was used as a technique for finding out the relationship of movement phases in split jerk with the selected kinematic variables. A standard motor driven camera i.e., canon-70 D EOS was used to obtain photo sequences of selected movements during the drive and receiving the barbell of split jerk in sagittal plane by a professional photographer.
The camera was mounted on a tripod at a height of 1.16 m from the ground. The camera was placed perpendicular to the sagittal plane and parallel to the horizontal plane at a distance of 3.36 m from the midpoint of the initial line.

The skill of split jerk of different subjects was filmed at Lakshmibai National Institute of Physical Education, Gwalior. The digital photography was taken under controlled conditions. The subjects performed the skill three times each.

The photographs obtained by the use of digital photography were analyzed by standard analysis method. Selected variables were as under.

Procedure of Location of Centre of Gravity: The following steps were followed in locating the Centre of gravity of each subject at the time of receiving the barbell in split jerk-

Instrumentations: Kinovea computer program was installed on the computer before applying the measurement procedure. Markers Round markers of 1.5 cm in diameter were glued on special bony landmarks. Video graphic method was used to biomechanically analyse the selected variables. Only one selected frame was analyzed. Selected variables were as under angles at selected joints as Ankle joint, Knee joint, Hip joint, Shoulder joint, Elbow joint, Height of Centre of gravity at the time of receiving the barbell in split jerk.

Findings

The score of each independent variable of angular and linear kinematic variables were correlated with the time of drop under in split jerk of the subjects. Selected moments were drive phase and final receiving of split jerk.

The values of correlation of selected angular biomechanical variables i.e. angle of selected joints at drive phase with the time of drop under in split jerk are presented in Table 1.

Table 1: Relationship of Selected Angular & Linear Kinematic Variables with the Time of Drop under in Split Jerk at Drive Phase

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Variables (Unit) Mean Coefficient of Correlation (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Right Shoulder Joint (Deg) 17.60 .184</td>
</tr>
<tr>
<td>2.</td>
<td>Right Elbow Joint (Deg) 90.80 -.242</td>
</tr>
<tr>
<td>3.</td>
<td>Right Hip Joint (Deg) 164.20 -.117</td>
</tr>
<tr>
<td>4.</td>
<td>Right Knee Joint (Deg) 130.20 -.927</td>
</tr>
<tr>
<td>5.</td>
<td>Right Ankle Joint (Deg) 110.80 .066</td>
</tr>
<tr>
<td>6.</td>
<td>Height of Centre of gravity of body (Cm) .46 -.906</td>
</tr>
</tbody>
</table>

Table 1 clearly revealed that the calculated value of correlations in all the variables were less than the tabulated value of (n-2) i.e. r(3) 0.878 at selected level of significance, therefore, the selected angular kinematic variables at the selected moment have shown insignificant relationship with the time of drop under in drive phase of Split jerk.

Table 2: Relationship of Selected Angular & Linear Kinematic Variables with the Time of Drop under in Split Jerk at Final Receiving Phase

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Variables (Unit) Mean Coefficient of Correlation (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Right Shoulder Joint (Deg) 216.20 -.008</td>
</tr>
<tr>
<td>2.</td>
<td>Right Elbow Joint (Deg) 28.80 -.389</td>
</tr>
<tr>
<td>3.</td>
<td>Right Hip Joint (Deg) 64.40 -.200</td>
</tr>
<tr>
<td>4.</td>
<td>Right Knee Joint (Deg) 51.20 -.286</td>
</tr>
<tr>
<td>5.</td>
<td>Right Ankle Joint (Deg) 109.20 .158</td>
</tr>
<tr>
<td>6.</td>
<td>Height of Centre of gravity of body (Cm) .46 -.026</td>
</tr>
</tbody>
</table>
Table 2 clearly revealed that the calculated value of correlations in all the variables were less than the tabulated value of r (n-2) i.e. r (3) 0.0878 at selected level of significance, therefore, the selected angular and linear kinematic variables at the selected moment have shown insignificant relationship with the time of drop under in final receiving phase of split jerk.

Discussion of Findings

As shown by the table 1 that none of the selected angular kinematic variables like angle of shoulder joint, elbow joint, hip joint, ankle joint showed any significant relationship at 0.05 level of significance at the drive phase. Thus it may be that the drive phase of a lifter does not determine the time required to get under the bar after the dip. To the scholar’s understanding weight lifters while executing the lift should have proper stance and grip so that they can go under the weight as quickly as possible.

Similarly as shown by the Table 2 that none of the selected angular kinematic variables like angle of shoulder joint, elbow joint, hip joint and linear kinematic variables like height of C.G of the bar, height of C.G of the body at the moment drop under stance showed significant relationship at 0.05 level of significance. Thus it may be that the split jerk position of a lifter does not determines the time required to get under the bar after the drive phase in jerk even though a proper split position of a lifter may help the lifter to effectively balance the weight lifted. Weight lifters while descending under the bar should have proper body positioning of the body along with the C.G. of both bar and the body so that they can descend under the quickly to hold the weight.

In the technique of jerk in weight lifting, the lifter works to gain control over a bar that has effectively been launched into the air during the dip i.e., the faster the lifter’s leg regain contact with the floor & the faster the lifter assumes a position in which he or she is able to receive force, the able the lifter will be to catch a bar so launched. However the above findings indicated that the selected linear and angular kinematic variables at the selected moments may not be the determining factors for an effective drop under time. The findings of the study may be attributed to small sample size selected for the study and because of unavailability of sophisticated equipment. Moreover the performance related to the skill of split jerk relies on much more viable contributing parameters apart from the selected kinematic variables selected for the study. Further the insignificant findings may also be attributed to poor skill level of the subjects selected.

Discussion of Hypotheses

Total two hypotheses were formulated in the beginning of the study in which:

1. The first hypothesis as stated earlier was that there will be significant relationship between the time of drop under and the selected angular kinematic variables in the moment drive phase in split jerk. However, the results showed no significant relationship between the times of drop under with selected angular kinematic variables rejecting the hypothesis.

2. The second hypothesis as formulated at the beginning was that there will be significant relationship between the time of drop under and the selected linear kinematic variables in the moment drop under stance in final split jerk. Since, the results of the study indicated no significant correlation between the time of drop under and the selected linear kinematic variables in the moment drop under stance in split jerk the hypothesis stated earlier was rejected

Conclusions

Based on the analysis and within the limitations of the present study, following were the conclusions drawn:

1. All the selected angular kinematic variables showed no significant relationship with the time of drop under in split jerk in weight lifting at both the selected moments.

2. All the selected linear kinematic variables also showed insignificant relationship with the time of drop under in split jerk in weight lifting at the moment under phase.

Recommendations

Based on the conclusions drawn in this study, the following recommendations have been made:
1. A study may be undertaken with large number of subjects and variables contributing to the time of drop under in split jerk.

2. Similar study can also be conducted on female weight lifters\(^{20}\).

3. The same study may be replicated with the use of much more sophisticated equipment's and by conducting on real competitive conditions in order to have more objective and accurate data for the purpose of biomechanical analysis.

4. Similar study can also be undertaken to biomechanically analyze various skills in other games and sports.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** NIL

**Conflict of Interest:** NIL

**REFERENCES**


Detection of Brain Tumor with Cellular Automata and Convolutional Neural Networks

Murugan A¹, Harsha R²
¹Associate Professor, ²PG Scholar, Department of ECE, M. Kumarasamy College of Engineering, Karur, Tamil Nadu

ABSTRACT

High grade brain tumor are very aggressive and most common disease globally. As a result the life expectancy of the diseased is very short with respect to low grade tumor. Fitting for the treatment within the planning staggering stage is that the key plan for saving the lifetime of medicine patients. CT (CT) and resonance imaging (MRI) is that the typically used imaging techniques to contemplate the tumors, however the massive amount of knowledge fashioned by magnetic resonance imaging prevents the physical segmentation in Associate in Nursing emergency time, limiting the employment of correct quantitative measurements within the medical exercise. Regular detection and segmentation ways area unit needed, however massive spatial and structural variability among brain tumour makes automatic segmentation and detection is that the rigorous drawback. during this paper, we have a tendency to projected Associate in Nursing regular segmentation and detection technique supported Convolutional Neural Networks (CNN) and Cellular automata (CA) supported Gary-level co-occurrence matrix (GLCM) to work out native transition perform. We have a tendency to conjointly analysed the employment of C-NN based segmentation along with pre-processing step, which, though not commonly used on CNN-based segmentation ways. Our proposal was valid by the info taken from the hospitals. Finally, a neoplasm has been extracted from the given info image with the improved performance measures.

Keywords: Brain Tumour Segmentation, Convolutional Neural Networks (CNN), GLCM, Cellular Automata (CA), Deep Learning, Resonance Imaging (MRI)

Introduction

Magnetic Resonance Imaging (MRI) is one of the most tools for brain tumour diagnosing, that is suitable and non-invasive for medical care and treatment. Brain tumour segmentation is one among the treatment ways to separate the abnormal regions of the brain. Magnetic resonance imaging pictures used for rending up consists of T1-weighted (T1), T2-weighted (T2). The brain tumour characteristic might vary from one patient totally different that causes the no inheritable pictures to different intensity signals. Therefore, brain tumour segmentation victimization magnetic resonance imaging pictures has become the difficult issue for segmentation with varied intensity. To beat this issue, unvaried algorithms area unit employed in neoplasm segmentation that is performed within the high-intensity image. These performances area unit are noted in several articles, though they are available out with several disadvantages. Several segmentation algorithmic rule yield higher performance, they still fail to phase the homogenized tumors against a similar background, similar intensity signals, weak or subtle edges. Therefore, these demerits result in over-segmentation and getting the incorrect boundary segmentation. Magnetic resonance imaging pictures of the human brain area unit a sophisticated image inflicting the problem of featured analysis. A texture that is hostile intensity shows a dynamic role within the portrayal of image physiognomies.

Texture analysis is employed to extract the neoplasm options. Gray-Level Co-occurrence matrix (GLCM) primarily based CA is that the well-known technique for the extraction of options of texture. GLCM is predicated on the existence of frequency at strength I and j at the peel of interest that displaced on neighbourhood peel. The neoplasm is that the smallest region within the brain as compared with the traditional brain. The projected technique provides the new texture image of brain tumor with MRI victimization GLCM primarily based
CA to beat the drawbacks of intensity supported the segmentation algorithmic rule. CNN is victimization to classify the tumor image. There unit varied ways of brain tumour segmentation that is expressly developed constant and non-parametric probabilistic model for the given data. These probabilistic prototypes comprise similar functions akin to observations and former model.

So the neoplasm segments area unit separated from the regular tissue exposed to form and property constraints. The atlas of brain tumour area unit assessed at separation time, as a result of the form and therefore the position of the tumour within the veins. Neoplasm growth is employed to estimate its mass impact that is useful in up atlases. The neighbourhood pixels of magnetic resonance imaging pictures area unit used for accomplishing power tool segmentation through Mathematician Random Fields (MRF).

This kind of segmentation is used in recent days. This technique incorporates histogram-based estimation of a similar functions. Within the previous models, they are generalized the unknown knowledge that is troublesome to translate 1st data into a probabilistic model. One among the ways of learning the distribution unswervingly from the data is coaching the dataset. One among the disadvantages is that previous ways wish to find out the brain tumour pattern that doesn’t follow the particular model. These approaches area unit used for pixels with high intensity which is self-determining and identically distributed, though the content are going to be depicted through options.

Generally tiny clusters are also erroneously categorized as a wrong class in unlikely locations. To beat these defects some authors embody neighbourhood by embedding probabilistic predictions of the classifier. Classifiers area unit of various varieties like are Support Vector Machine (SVM), Artificial Neural Networks (ANN). The foremost recently employed in brain tumour segmentation is Random Forest (RF).

RF is wide used as a result of multi-class issues handling and have extraction. The massive space of the structural and practical variability of brain tumour is going to be necessary factors that we will study in knowledge augmentation. The content of this paper which incorporates the subsequent section. In Section II projected technique is discussed. The information that is taken as input image is processed further. It is processed in Section III. Final Outcomes area unit performed in Section IV. Conclusion and Future work are going to be dead in Section V.

Project Technique

The projected technique is explained in figure. 2. There area unit varied stages within the brain tumour segmentation which incorporates the subsequent. They will be Image acquisition, Pre-processing, segmentation victimization fuzzy clump, Feature extraction victimization GLCM-CA, Classification victimization CNN.

![Input Image](image)

**Figure 1: Input Image**

**A. Pre-Processing:** The concentration of the identical tissues might vary from one image to a different because of the bias distortion. This bias, distortion might cause changes within the magnetic resonance imaging pictures. To correct the changes within the intensity we have a tendency to applied N4ITK technique. However the intensity distribution of various pictures is analogous so this technique isn’t enough that realize the intensity of the magnetic resonance imaging image sequence.

These ways area unit implicit or express segmental. The magnetic resonance imaging pictures of the patient will vary within the same patient after they area unit deed the similar scanner at completely different time points or prevalence of any pathological malady. So, to extend the intensity
Associate in nursing distinction ranges across varied patients we have a tendency to apply a concentration standardization technique projected by Nyulet al on every structure. In this technique, strength landmark sets area unit learned from the coaching and check dataset. Training Dataset consists of magnetic resonance imaging image sequence that has the various concentration at the score.

At the preparation stage, intensity standardisation is skilful by a linear transformation of the initial image into 2 landmarks across the topics of intense. In this manner, the bar graph of every categorisation is additional connected across problems. When standardising the magnetic resonance imaging pictures, we have a tendency to calculate the mean intensity worth. Pre-processing stage is followed by the segmentation method victimization fuzzy clump. The flowchart of the projected work is shown in an exceedingly figure 2.

There area unit completely different ways to calculate the space of the nearest centre of mass and one among the foremost used ways is that the Euclidian distance.

After the first method is finished, it work out the new centre of mass of every Nameirakpam Dhanachandra et al./Procedure technology fifty four (2015 ) 764 – 771 767 cluster and supported that calculated centre of mass purpose, a brand new Euclidian distance is taken into account among every centre and every datum. The points should be allocated within their collection may have the bottom worth of Euclidean distance. Every set within the sub-divided parts are unit done is by its member substances and by its centre of mass. In order to reduce the total distance of all the substances present in a cluster we should calculate the centres of mass for all the cluster. Thus K-means is Associate in Nursing unvaried loop algorithmic rule.

Reduces the total distances from every purpose of the article to its cluster centre of mass, over all clusters. Let us consider a picture with matrix x and y which allows the picture to be grouped as a k variety of clusters. Let us have the nursing input as p (x, y) in pel size, which to be clustered and C_i be the cluster centres. The algorithmic rule for k-means clump has the subsequent steps

1. Initialize number of clusters to be formed which is represented as k and center.
2. For every pixel of an picture, calculate the euclidian distance worth asked, between middle and also every pel of a picture victimization the relative given below.

\[
\text{Euclidean Distance} = \sqrt{(x - p_x)^2 + (y - p_y)^2}
\]

**Figure 2: Diagram of Projected Technique**

**B. Segmentation:** Clustering could be a technique to separate a group of knowledge into a varied variety of clusters. It’s one among the most effective ways of separation is k-means clump. In k-means clustering, set of data is segmented into a k number group of data1, 2, and 3. It classifies a given group of data collections into k number of disjoint clusters. K-means algorithmic rule involves of varied individual phases. Within the 1st part, the segmental knowledge, calculate the k centre of mass and within the second stage it takes severally purpose to the disjoint cluster that has adjacent centre of mass from the datum.
\[ d = p(x, y) - C_k \]

3. Apportion all the values of the pixels to the contiguous centre supported distance \( d \).

4. Finally pel values are allotted, work out the new position of the middle victimization the relative given below.

\[ C_k = 1 \times y^*(C_k \times * (ck \ p(x, y))) \] (4)

5. Repeat the method until it satisfies the tolerance and therefore the error

6. Reconstitute the cluster of the pixels into image.

Figure 4: Intensity Standardisation

C. Feature Extraction Victimization GLCM-CA:
Gray Level Co-Occurrence Matrix (GLCM) has verified to be a 1 of the well-liked numeric always of extracting texture feature from pictures. In keeping with grey Level co-occurrence matrix, Haralick defines that there are unit fourteen textural options measured from the likelihood matrix to take out the features of texture statistics of remote sensing pictures. There are four necessary options considered in this paper. They are Angular moment (energy), (inertia moment), Correlation, Entropy, and therefore the Inverse distinction Moment is chosen for implementation victimization Matlab. Angular Second Momentum is additionally referred to as Uniformity or Energy. It’s the number of squares of every feature within the GLCM. Angular Second Momentum conjointly measures the image homogeneity. Angular Second Momentum is extremely high once the image has superb homogeneity or once the pixels area unit too similar in their values. ASM = …1 wherever i, j area unit the elevation coordinates domain of the perform p (i, j), metric weight unit is grey tone. Converse Modification Moment is that the native homogeneity of the image. It’s high once native grey level is uniform and inverse GLCM is terribly high. IDM weight worth is that the inverse of the distinction weight. The formulation and extraction of the options of input pictures area unit extracted victimization Matlab. Image feature extraction technique that is GLCM-CA is employed during this paper. All the feel options which will be real numbers. Real numbers cannot be displayed victimization pictures that show solely rows or columns as outputs. So, to convert the options of GLCM into the photographs we have a tendency for area unit victimization using cellular automata.

\[ P(i, j) * \left( \sum_{k=0}^{n} x(i, j) \right) \] \( \cdots \) (5)

All matrices within the higher than figure.2 is performed to the MRI image background so deed the image is barely the remaining brain texture regions. In experimental calculation \( P_0 \) is calculated on be normalized, that is outlined as

\[ (x)^n = \sum_{i=0}^{n} y(i, j) * x^y \] \( \cdots \) (6)

D. Convolutional Neural Networks:
Convolutional neural networks (CNNs) which can be connected using the various networks. The main part of CNN is the collection of smaller particles called neurons. These neuron network are joined together to form the processing portions of the original database image. The final outcome of these processed portions are arranged based on their region overlapping. By eliminating the region overlapping, the input image can be performed with more accuracy than the other neural networks. The main process of the CNN consists of the hidden layer input layer and output layer. In Convolutional networks, the outputs of various layers of neuron clusters are combined with local or global pooling layers. Here the convolutional layers are embedded with fully connected hidden layers which enable the point wise nonlinearity at the end of or after each layer of neurons.

The convolutional technique objective is to extract the smaller features of the cells in the brain
image such that the small error within the data is eliminated. In the proposed system, the weighted amount of the hidden layers are incorporated along with the input of the brain images of conventional layer. Here the weighted rate in each pixels is reduced by using the filters error rate of the pixels so as to retain the accuracy and Time Delay of the Neural Networks: The convolutional neural networks outperform other conventional classifiers by using little preprocessing approach. The human effort in analyzing the features and lack of prior knowledge facilitates the CNN as more advantages than the other networks. Brain tumour segmentation explains the benefits of CNN. In spite of the fact that the dominant part of creators utilized 2D filters, “joins the two convolutional layers which are isolated with the maximum pooling with walk 3 alongside one completely associated (FC) layer and a delicate max layer in actualizing the 3D framework to such an extent that the 3D channels can exploit the 3D idea of the pictures. Notwithstanding their two-pathway arrange, manufactured a course of two systems and played out a two-organize preparing, via preparing with adjusted classes and afterward refining it with extents close to the firsts parallel CNN to distinguish the total tumor.

Result

The brain tumour input image is segmented and clustered using Fuzzy clustering. Then the image is extracted using GLCM-CA extraction process. The extracted image shows the presence of tumor region.

Conclusion

Thus, the diagnose of brain tumour is enhanced with technique such as Convolutional Neural Networks (CNN) and Cellular automata (CA) supported Gray-level co-occurrence matrix (GLCM) is developed extract to neoplasm from the given info image with the improved performance measures. The standardisation of the magnetic resonance imaging pictures, the tendency to mean intensity is calculated. The segmentation method victimization fuzzy clamp is performed to prepare variety of clusters. The clusters can be formed by Support Vector Machine (SVM) and Artificial Neural Network (ANN). From which Gray Level Co-Occurrence Matrix (GLCM) has verified to be a 1 of the
well-liked numerical ways of extracting texture feature from pictures. Convolutional networks might embody native or comprehensive combining layers that mix the outputs of varied layers of nerve cell clusters.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES


A Survey on Brain Tumor Segmentation Techniques

K. Sambath Kumar¹, A. Rajendran²

¹Assistant Professor, Department of Electronics and Communication Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, Tamil Nadu; ²Professor, Department of Electronics and Communication Engineering, Karpagam College of Engineering, Coimbatore, Tamil Nadu, India

ABSTRACT

Brain tumors are most aggressive and tends to short life expectancy rate. Automatic segmentation is important for quantitative analysis in MR brain images. Magnetic resonance imaging (MRI) is a common imaging technique to assess these kind of tumors which gives segmentation in a reasonable time and produces large amount of data. This paper presents survey on automatic brain tumor segmentation and discuss validation metrics like dice similarity coefficient, specificity, sensitivity, true positive, true negative and etc. The main scope of this paper is to compare the different segmentation techniques.

Keywords: Brain Tumor, MRI, segmentation

Introduction

In a Brain, Gliomas are the most crucial one, it has less aggressive (LGG) in a patient with high life expectancy rate, or more aggressive (HGG) in a patient with short life expectancy rate¹. The treatments for these kind of tumors include surgery, radiotherapy, chemotherapy, or a combination of these² may be used to reduce the growth rate. Some of the tumors meningiomas easily localized, others like glioblastomas and gliomas are very difficult to localize. These are difficult to segment because of shape, size and poor contrast.

The efficient segmentation of gliomas is much more helpful not only for diagnosis but also for follow-up evaluations. Manual segmentation takes more time to segment and difficult to analyse inter and intra-rater errors because doctors evaluate with rough measures¹. The fundamental difficulty in a segmentation is that, which may lies on anywhere, almost any shape and size. However, unlike X-ray image, Computed tomography (CT) scans, the MR images scale values are not standardized. Depends on MR machine type (1.5, 3 or 7 tesla) and acquisition protocol such as field of view value, voxel resolution, gradient strength, etc.

Healthy brain has three types of tissues: the white matter (WM), the gray matter (GM) and the cerebrospinal fluid (CSF). To detect the location and tumor region extension, namely tumorous tissue, necrotic tissue and edema is done by brain tumor segmentation. To identify normal areas in the tissue, more than one MRI modality is required, e.g. T1, T1c, T2, Proton density (PD) contrast imaging, diffusion MRI (dMRI) and FLAIR pulse sequences.

Related Work

Now a days deep leaning popular among all applications for accuracy. It is automatically learning from the data which gives number of features. Zikic et al.³ implemented CNN with two convolutional layers and only one hidden layers separated by max-pooling with stride 3, followed by only one FC layer and a softmax layer. Segmentation methods classified into two models namely based on generative models and based on discriminative models⁴,⁵,⁶.

Generative models depends on prior domain-specific knowledge which provides locality of both healthy and tumorous tissues. The appearance of tissue is complex process to characterize, and an existing models identifies shape of the tumor which deviates from normal tissue⁷. A general generative model can be found in⁸. Others depends on alignment features and/or left-right symmetry features of brain⁹,¹⁰,¹¹.

Other approach as discriminative models, it exploits little prior knowledge of brain anatomy instead of low level features, which models features and given voxel
These may be raw input pixels\textsuperscript{12}, local histogram values\textsuperscript{13,14}, Gabor filter banks\textsuperscript{15,19} or inter-image gradient, difference in region shape and symmetry analysis alignment-based features\textsuperscript{23}. Segmentation done by 3D filters\textsuperscript{18}, but mostly authors\textsuperscript{19-23} opted for 2D filters only. 3D filters gives natural image but computation time is increased. Some authors implemented two-path way networks in which one path has bigger patches compared to other patch size\textsuperscript{19}. Additionally, Havaei et al. built a cascade connection of two networks and implemented a two-stage training.

Method

The followings steps are used to find brain tumors.

**Figure 1: Steps for Image Segmentation process**

1. **Image Pre-processing:** Before processing an image, some of the authors performing pre-processing to remove unnecessary artifacts. It may involves noise removal, strip elimination, conversion into greyscale image. The removal of noise done by any of the filtering methods.

   A. **Median Filter:** This is non-linear technique to eliminate salt and pepper noise from an image. It is processed with help of average value of pixels which also used to reduce speckle noise but it preserves edges and boundaries. Time consumption is drawback of this filter.

   B. **Mean Filter:** It is used to reduce Gaussian noise and computation time is fast compared with median filter but edges and boundaries are getting distortion.

   C. **Wiener Filter:** It is working under inverse filtering in the frequency domain. Efficiently eliminate blur in an image. Computational speed is low and not suit for speckle noise.

   D. **Hybrid Filter:** It is combination of both Median Filter and Wiener filter. It eliminates blur in an image, speckle noise and impulse noise. It is complex and time consumption is high.

   E. **Modified Hybrid Median Filter:** It is the combination of both Mean and Median filter and efficiently reduces salt and pepper noise, speckle noise and the gaussian noise. It requires high consumption time.

2. **Image segmentation:** This technique is used to partition an image into number of minor portions. It produces different set of pixels within an image.

   A. **Threshold segmentation:** Each pixel in an image assigned by a label and same label has certain visual features. It has threshold value which converts a grey scale value into binary image.

   B. **Morphological based segmentation:** It describes the shape and structure of an image and recognize objects or boundaries within the image. It compares neighbourhood of pixels within a pattern. Usually which is implemented foe binary image pixels; 0 or 1.

   C. **K-Means algorithm:** It is useful for poor contrast image and larger images and followed by most of the researchers. It leads difficult to establish fuzzy sets.

   D. **Histogram based segmentation:** Very effective one compared to other image segmentation algorithms. From the pixels histogram is computed, peaks and valleys are used to describes the clusters in the image. It is recursive operation until to get smaller clusters so that more number of clusters are formed. Peaks and valleys are difficult to identify.

   E. **Graph partitioning methods:** The impact of neighbourhood pixels is to be considered for segmentation under the homogeneity assumptions. Depends on criterion of clusters, graphs are partitioned. The followings are popularity among these algorithms.
(a) Normalized cuts  
(b) Random walker  
(c) Minimum cut  
(d) Isoperimetric partitioning  
(e) Minimum spanning tree-based segmentation  
(f) Segmentation-based object categorization

**F. Trainable segmentation:** Most of segmentation techniques depends on pixels colour information but which require a domain knowledge. Neural network segmentation working under smaller areas in an image using ANN (Artificial Neural Network).

**G. Multispectral segmentation:** It differentiates tissue classes of similar characteristics in a single imaging modality. It discriminates different tissue classes.

**3. Feature Extraction:** Due to complexity brain structure, accurate tumor extraction is difficult task. So some criterions is to considered to get features like shape, size and location.

**A. Edge detection:** Sudden intensity change in an image is edge. After detection of this, the associated pixel as marked as edge pixel. Some of the algorithms given to determine the edges.

(a) **Prewitt edge detection:** It approximates both Horizontal and vertical derivative which is calculated by using two 3×3 masks.

(b) **Robert edge detection:** The distinct differentiation is to estimate image gradient for edge detection operation. The Robert mask, high spatial regions are evaluated.

(c) **Sobel edge detection:** It is mostly like Prewitt mask. It has high edge intensity and sobel operator has values; ‘2’ and ‘-2’ which is to be placed in the center of 1st and 3rd columns of the horizontal mask and 1st and 3rd rows of the vertical mask.

**B. Histogram of Oriented Gradient extraction:**

The pre-processed image is classified into 32×32 pixels and the intensity of each pixel is either 0 or 1

again image is distributed into 8×8 pixels which is called as box. Again each box will be divided into 9 bins as 3×3 matrix. Therefore, it has 9 features and leads to “9×4” for each block. Finally HOG having “9×9×4” in 1D or “1×324” in vector image representation.

**Discussion**

Magnetic resonance brain image is divided into different number of tissue classes. provides high accuracy in segmentation as well as spatial consistency. This network has multiple patch sizes and multiple kernel sizes to establish multi-scale information. Segmented with help of single MR image only. It is established with 5-different data sets; 30 weeks PMA T2 weighted pre-term infants and 40 weeks PMA, axial T2 weighted pre-term infants of 40 weeks PMA, axial T1 weighted images of 70 years of an average age, and T1- weighted image of 23 years of an average age.

Bias correction method is established on neonatal images and adult images applied in the MRBrainS13 challenge and multi-atlas labelling challenge. Brain masks were applied to reduce the number of pixels. Three patches with size of 25×25, 51×51 and 75×75 are used with multiple convolution layers and kernels used 5×5, 7×7 and 9×9 respectively.

Automatic segmentation based on CNN with 3×3 kernels used in this work. It gives deeper architecture and has no effect against overfitting with fewer number of weights in the network. Intensity normalization with data augmentation is very effective for segmentation in MR images.

The weights can be adapted during training stage by backpropagation, to enhance certain features. Convolution layers has less number of weights compared to FC layers. Pooling is more compact and combines nearby features; it reduces the computational load for next stage. Most common method is max pooling or average pooling. Dropout applied on FC layers. It eliminates node from the network.

For Low grade and high grade glioblastomas implemented a Novel CNN architecture which gives both local features and global features simultaneously. It has two – phase training procedure to handle difficulties of tumor labels. The basic CNN output is treated as an additional source for cascade architecture of subsequent CNN. TwopathCNN has a local path and global path details. The average of LocalpathCNN and GlobalpathCNN as AveragepathCNN.

Deep Convolutional neural network (DCNN) provides high in accuracy and commonly used deep learning networks. The DCNN has Complex due
to number of layers between input and output, filter coefficient parameter and fully connected layers weights to be adjusted. The complexity of network is to be reduced by adjusting FC layer weights.

A new coarse-to-fine method is applied to segment tumor which contains pre-processing, classification based on deep learning and post – processing. To extract image patches pre-processing method is applied for each MR image. The High level features extracted form stacked auto-encoder network which is used to classify image patches. After mapping, morphological filter is applied to get final segmentation result as post – processing technique.

Table 1: Result comparison of different algorithms

<table>
<thead>
<tr>
<th>Performance metrics</th>
<th>pim mosekops</th>
<th>sergio pereira</th>
<th>M.Havaei Two path CNN</th>
<th>M.Havaei Mfcascade CNN</th>
<th>D.Jude Hemanth DCNN</th>
<th>D.Jude Hemanth MDCNN</th>
<th>Zhe Xiao</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dice</td>
<td>complete</td>
<td>0.86</td>
<td>0.78</td>
<td>0.85</td>
<td>0.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>core</td>
<td>0.65</td>
<td>0.78</td>
<td>0.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>enhance</td>
<td>0.75</td>
<td>0.73</td>
<td>0.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPV</td>
<td>complete</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>core</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>enhance</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>complete</td>
<td>0.86</td>
<td>0.8</td>
<td>0.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>core</td>
<td>0.76</td>
<td>0.76</td>
<td>0.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>enhance</td>
<td>0.68</td>
<td>0.75</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specificity</td>
<td>complete</td>
<td>0.93</td>
<td></td>
<td>0.89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>core</td>
<td>0.8</td>
<td>0.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>enhance</td>
<td>0.72</td>
<td>0.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP rate</td>
<td></td>
<td></td>
<td></td>
<td>0.88</td>
<td>0.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN rate</td>
<td></td>
<td></td>
<td></td>
<td>0.96</td>
<td>0.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acc in %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>94.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP in %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>96.4</td>
<td>96.24</td>
<td></td>
</tr>
</tbody>
</table>

The performance metrics of different works are compared in Table-1. Dice similarity coefficient, PPV (measure of amount of False Positive and True Positive), Sensitivity, Specificity, TP, TN, Accuracy and MP (percentage of correct match between segmentation result and ground truth) are validated for different works and shown in Table.

Among these, Pim mosekops gives an average Dice coefficient metric of 0.86, Sergio gives 0.73, 0.76 and 0.77 as an average dice, PPV and sensitivity values respectively. M.Havaei implemented networks for Two way CNN and cascade CNN. Two path CNN gives 0.79, 0.77 and 0.82 as an average dice, sensitivity and specificity values respectively. Cascade CNN gives 0.79, 0.82 and 0.79 as an average dice, sensitivity and specificity values respectively. Jude’s DCNN method gives 0.88 and 0.96 as True positive rate and True negative rate. MDCNN gives 0.92, 0.97, 94.5 and 96.4 as TP, TN, Accuracy percentage and MP values respectively. Zhe Xiao gives 96.24 MP values.

Conclusion

In this review paper various brain tumor segmentation techniques discussed. Each method has some merits and demerits. Few authors before going into segmentation, applied pre-processing to eliminate unwanted things from the image and applied different patches and different kernels which gives various features depends on size of kernels. Not single technique is suit for all images because of noisy, contrast and etc., all above mentioned techniques best in different performance metrics. Due to these factors, still segmentation is challenging problem.

Ethical Clearance: Taken from the committee

Source of Funding: NIL

Conflict of Interest: NIL
REFERENCES


Hand Talk-An Assistive Technology for Deaf and Dumb

T. Ranganathan¹, P. Hephzibah², M. Jagadesh², R. Jegadees², S. Kanimozhi²

¹Assistant Professor, ²U.G. Students, Department of EEE, Karpagam College of Engineering, Coimbatore, Tamil Nadu

ABSTRACT

Hand Talk is an assistive technology for deaf and dumb people. In general deaf and dumb people communicate with the normal people through sign language, but it is very difficult for all of us to communicate in an effective manner. Thus an efficient and easy way of communication for disabled people is found which is called as hand talk. Hand Talk usually converts the hand movements/gestures which is made by the disabled person and converts it to a voice message or it will display it on LCD as text message. This system works on basis of sensors and arduino. The hand signals which are sensed by the flex sensor which is fitted to each finger of the hand glove. Based on the bending of flex sensor a desired resistance and corresponding voltage is detected. The output is further fed through the arduino as input and it will check for the predefined value in it. If the predefined value matches with the given input the system will display the corresponding output message through voice box shield or LCD display.

Keywords: Hand Talk, Assistive technology, LCD, Flex Sensors, Kinect XBOX 360TM and Arduino Board

Introduction

As we know communication is playing a major role in human lives. Unlike animals we are blessed with all the six senses but unfortunately not all are lucky enough. some have the disability in speaking and hearing. These people communicate with normal people through sign language. The system hand talk gives the best alternative solution for sign language communication. In this system instead of communicating through sign language we are converting hand gestures into a voice output which will be easier and efficient way for communication of deaf and dumb people.

Hand talk prototype consists of group of flex sensors, arduino board, voice box shield, contact sensor, LCD. The hand gesture is sensed through flex sensors.

Literature Review

Talking with Hand: The first Hand Talk glove was designed by Ryan Patterson in the year 2001. Sign Language Translator consists of two separate components, a leather golf glove that has ten flexible sensors fixed into it which monitor the position of the fingers by measuring the electrical resistance created by the fingers as they bend. A microcontroller which is fitted to the back of the hand glove converts the observed electrical energy into digital output and send them to a computer which done by wireless connection. The system i.e. Computer or laptop then converts them into the words which appear on it.

The only difficulty faced with this system is that computer or laptop is always required for its working.

Sign Language Translator using Microsoft Kinect XBOX 360TM: Daniel MartínezCapilla proposed the automatic sign language translator. so that a computer will output the corresponding word to a sign executed by a deaf user in front of a camera. In this, the Microsoft Kinect XBOX 360TM is used to solve the problem of sign language translation. By using the tracking capability of this RGB-D camera, a meaningful 8-dimensional descriptor for every frame is introduced here. The project does not focus on a particular official dictionary of signs because the objective consists of evaluation the efficiency of the approach for sign recognition purpose. It has an accuracy of95.238%.

Intelligent Sign Language Recognition for Deaf and Dumb: S.Philomina and M.Jasmin introduced an intelligent system which converts the hand gestures into voice output. The idea consisted of group of Flex sensor, machine learning and artificial intelligence concepts to take visual inputs of sign language’s hand gestures.
and generate easily recognizable form of outputs. The system which can act as a translator between the sign language and the spoken language dynamically and can make the communication between people with disability and normal people in an efficient way. The output are expressed in terms of voice or text.

**Contact Sensor:** Contact sensors are used to sense the difference in signs such as static or dynamic signs. For example, signs live U and V have very minimum variation in finger position. So it is necessary to use the contact sensor to detect dynamic signs accurately.

**Arduino Uno:** Arduino UNO AT-mega 328 is used for this system. The combined output of flex and contact sensor is fed to the arduino. The microcontroller has predefined range of values. The given input value of arduino is then crosschecked with pre-stored value in microcontroller.

**LCD and Voice Box Shield:** If the output is within the range of pre-stored values then the corresponding voice message is produced through voice box shield and the message is displayed in LCD.

**Working:** Hand talk system mainly works with flex sensors, contact sensor, arduino board, voice box shield, LCD. It is most efficient that the system is programmed with arduino board.

The gloves equipped with flex sensors and contact sensors are fitted in the hands of disabled person. The hand gestures and finger position made by the person is sensed by the sensors. The sensors output is in the form of analog value which is given to analog input pin of arduino board. The output is further cross checked with the pre-stored values in the arduino. If the output values are within the range of pre-stored values then the corresponding message will be displayed in LCD and voice message is produced through voice box shield.
Flex Sensor Program and Result

Program

```c
int result = analogRead(A0);
Serial.print("SENSOR VALUE:");
Serial.println(result);
delay(500);
```

Result

Applications

1. It is used in hospitals for continuous monitoring of patients and their needs.
2. It is used in 3D gaming platform where virtual hand movements are needed.
3. It is mainly used for communication of deaf and dumb people.
4. It is applicable in military purpose for secret squad communication
5. In the field of robotics and automation this system can be used.

Future Enhancement: It can be also implemented using zigbee technology or Bluetooth technology for wireless communication.

For further enhancement, use internet of things technology (IOT) where the data can be stored in a cloud and retrieved for more information.

It can also be further enhanced with the help of implementation of more sensors and we can sense different data such as patients heart beating sensing.

Conclusion

In this system arduino is used instead of microcontroller which is more efficient and easy to program. The arduino is programmed through embedded C program. The movement of fingers is finally converted into voice output and a text message. It is more efficient because it uses more sensors and arduino for sensing the hand gestures and to produce the output.

Ethical Clearance: Taken from the committee

Source of Funding: NIL

Conflict of Interest: NIL

REFERENCES


Identification of Influential Indices of Heart Diseases Using Support Vector Machine

Angel Latha Mary S.¹, Uma Maheswari K.²
¹Professor; ²Assistant Professor, Karpagam College of Engineering, Coimbatore, Tamilnadu, India

ABSTRACT

Heart attack is a global leading cause of death for both gender and the occurrence is not always known to us. Usually heart rate calculation has traditionally been conducted using specialized hardware or device. It used most commonly in the form of pulse dosimeters or electrocardiogram devices. This system tries to assist the specialists to diagnose heart disease earlier and evaluate related risk factors. Data mining techniques were applied on a dataset. Finally, the main heart disease diagnosis indices were identified and a model was developed based on extracted rules. R programming was used to write the algorithm code.

Keywords: Heart Disease, Data Mining, Classification, Support Vector Machine, Decision Tree, Machine Learning.

Introduction

Now day’s Health care problems are increasing at a very high rapidity like coronary heart diseases, obesity and lung failure causing death rate 8 million people per year. There is a need to overcome from all such problems. More than 4 million people are at high risk of having heart attack. Cardiovascular diseases will become the leading cause of death up to 2030.

Cardiovascular diseases are known because the leading reason behind death within the world. They have been introduced because the most preventable and manageable diseases in Nidhi Bhatia and Kiran Jyoti. The entire and proper treatment of a sickness depends on the timely identification of that sickness in Aditya Methaila et al. An accurate and systematic tool for identifying high-risk patients and extracting information for timely identification of cardiopathy looks a vital need.

Every day, modern computer-based systems collect large amounts of data using automatic data record systems in different fields. Data mining technology is the product of the evolution of database technology, IT and storage devices Goyal et al. The current challenge is to make data mining and knowledge discovery systems applicable to a wider range of domains. Researchers are adopting data mining techniques to diagnose different diseases including diabetes enzi et al., stroke Sarang et al., cancer Panzarasa et al. and heart disease in Dahiya et al.

The main aim of this paper is to use data mining methodologies to monitor the patient’s health information continuously. Data mining provides many tasks that could be used to study the patient’s diagnosis report. In this research, the support vector machine and various data mining methods are used to evaluate the risk factors of heart disease and as there are many approaches that are used for data classification, the decision tree method is used here.

Material and Method

There are different data mining techniques used to help specialists and physicians diagnose heart disease chitra et al., (2007). Some techniques are more common such as Naïve Bayes, decision tree and K-nearest neighbor. However, there are other classification-based data mining techniques such as kernel density, neural network, bagging algorithm, sequential minimal optimization, direct Kernel self-organizing map and support vector machine. The section III briefly explains those techniques which were used in this study.

Table 1: Frequency Usage of Classification Algorithms

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Usage frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBC</td>
<td>20</td>
</tr>
<tr>
<td>DT</td>
<td>85</td>
</tr>
</tbody>
</table>
The Table I represents the usage frequency of various classification algorithms. Observing the above table the most frequently used techniques are SVM, Decision Tree, Bayesian Classifiers and Nearest Neighbor Classifiers. Hence, the experiments were conducted on the above four techniques.

a. Decision Tree: There are different types of decision trees. They only differ in the mathematical model they use to select the class of attribute during rule extraction. Gain ratio decision tree is the most common, successful type in Sridhar et al.\textsuperscript{7}. It is a relationship between entropy (information gain) and classified information. In entropy technique, the attribute which minimizes entropy and maximizes information gain is selected as the tree root. To select tree root, it is first necessary to calculate the information gain of each attribute. Then, the attribute maximizing information gain should be selected by Sarangi et al.\textsuperscript{8}.

b. Bayesian network: Bayesian network is a statistical technique predicting the membership class of the studied sample using the probability theory in Kumar et al.\textsuperscript{13}. Bayesian network practices classification process in accordance with Bayes’ theorem. It assumes that the influence of the value of a theorem on a class is independent from the influence of other attributes. This assumption is called “class conditional independence”. This assumption was made to simplify engaged calculation and this is why it was named “Naïve”, i.e., simple.

This technique calculates the prior probability of the response variable and the conditional probability of other variables. The prior and conditional probabilities of the initial training are calculated. Then, for every test dataset sample, the probability of the occurrence (Presence) of each case of response variable is calculated. Afterwards, the response variable with the highest occurrence probability is selected.

c. K-nearest neighbor: This classification technique is called a memory-based technique, since the training samples should be stored in memory during run-time. If a is the first sample denoted by (a₁, a₂, ..., aₙ), and b is the second sample denoted by (b₁, b₂, ..., bₙ), the distance between them is calculated by relation 1-1.

\[
\sqrt{(a₁ - b₁)^2 + (a₂ - b₂)^2 + (aₙ - bₙ)^2}
\]

d. Support vector machine: Given availability of support vectors, Support Vector Machine (SVM) is the boundary determining the best data classification and separation. In SVM, only those data lying inside support vectors are used as the base data for machine and building a model. This means that this algorithm is not sensitive to other data.

It aims to find the best data boundary with the farthest possible distance from all classes (their support vectors). SVM transfers data to a new space with respect to their predetermined classes so that data can be classified and separated linearly (using hyper planes).

Then, it searches for support lines (or support planes in multi-dimensional space) and tries to determine the equation of a straight line that maximizes the distance between each two classes. Each support vector is characterized with an equation describing the boundary line of each class.

Results and Discussion

This study used “Heart Disease Dataset”. This dataset included 13 attributes (Table II) and 200 samples. The continuous values of this dataset were discretized using equal frequency method. This technique classifies continuous values into 5 classes. Selected data mining techniques were applied on the sample dataset once dataset discretization. 10-fold cross-validation technique was used to validate the results. This method classifies dataset into 10 parts. 9 parts were used for preparing the algorithm and 1 portion was used for evaluation in each run-time.
Table 2: Patient Data Set

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Age in year</td>
</tr>
<tr>
<td>Sex</td>
<td>Male &amp; female</td>
</tr>
<tr>
<td>cp</td>
<td>Chest pain type</td>
</tr>
<tr>
<td></td>
<td>1.typical angina</td>
</tr>
<tr>
<td></td>
<td>2.atypical angina</td>
</tr>
<tr>
<td></td>
<td>3.non-angina pain</td>
</tr>
<tr>
<td></td>
<td>4.asymptomatic</td>
</tr>
<tr>
<td>Trestbps</td>
<td>Resting blood pressure in (mm Hg)</td>
</tr>
<tr>
<td>Chol</td>
<td>Serum cholesterol in (mg/dl)</td>
</tr>
<tr>
<td>Fbs</td>
<td>FBS&gt;120(mg/dl)</td>
</tr>
<tr>
<td>Restecg</td>
<td>Resting electrocardiographic results</td>
</tr>
<tr>
<td></td>
<td>S-t wave abnormality</td>
</tr>
<tr>
<td>Thalach</td>
<td>Maximum heart rate achieved</td>
</tr>
<tr>
<td>Exang</td>
<td>Exercise-induced angina</td>
</tr>
<tr>
<td>Old peak ST</td>
<td>Depression induced by exercise relative to rest.</td>
</tr>
<tr>
<td>Slope</td>
<td>The slope of the peak exercise segment</td>
</tr>
<tr>
<td></td>
<td>1.up sloping</td>
</tr>
<tr>
<td></td>
<td>2.flat</td>
</tr>
<tr>
<td></td>
<td>3.down sloping</td>
</tr>
</tbody>
</table>

The Table III shows the accuracy of Decision Tree, Navie Bayes, k-Nearest Neighbor and Support Vector Machine algorithms for classification applied on the above data sets using 10-fold cross validation is observed as follows:

Table 3: Classifiers Accuracy

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Accuracy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision Tree</td>
<td>81</td>
</tr>
<tr>
<td>Naïve Bayes</td>
<td>85.76</td>
</tr>
<tr>
<td>KNN K=9</td>
<td>81.30</td>
</tr>
<tr>
<td>SVM</td>
<td>86</td>
</tr>
</tbody>
</table>

From the table III, SVM achieved the highest accuracy 86% and Navie Bayes also achieved good accuracy compared to other techniques. (KNN (k=9) with 81.30% and Decision Tree with 81%).

After implementing the above mentioned 4 techniques the following 13 influential factors are identified. Table IV compares all the attributes in terms of their significance based on the results obtained from the above techniques.

Table 4: Identification of Influential Factors

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Important degree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Naïve Bayes</td>
</tr>
<tr>
<td>Age</td>
<td>0.8</td>
</tr>
<tr>
<td>Sex</td>
<td>-</td>
</tr>
<tr>
<td>Cp</td>
<td>0.1</td>
</tr>
<tr>
<td>Trestbps</td>
<td>0.04</td>
</tr>
<tr>
<td>Chol</td>
<td>0.05</td>
</tr>
<tr>
<td>Fbs</td>
<td>0.06</td>
</tr>
<tr>
<td>Restecg</td>
<td>0.07</td>
</tr>
<tr>
<td>Thalach</td>
<td>0.06</td>
</tr>
<tr>
<td>Exang</td>
<td>-</td>
</tr>
<tr>
<td>Oldpeak</td>
<td>0.09</td>
</tr>
<tr>
<td>Slope</td>
<td>-</td>
</tr>
<tr>
<td>Ca</td>
<td>0.21</td>
</tr>
<tr>
<td>Thal</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Conclusion

Heart disease is the leading cause for death across the globe. Cardiovascular diseases have been identified as the leading cause of death within the past decade, they are the most preventable and governable diseases at constant time. Deaths from cardiovascular diseases show associative ever-increasing trend. On the other hand, their early identification plays a vital role in up patient’s health
standing and decreasing fatalities. Therefore, this study aimed to help physicians to identify such diseases and assess cardiopathy risk factors in studied people. Choosing different data mining techniques and implementing them on the chosen dataset, SVM technique achieved the best accuracy (86%). In SVM more over the other techniques, thal, ca and cp were introduced as the most influential indices on average. This technique is expected to be implemented in future on a localized dataset with non-aggressive indices in general.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** NIL

**Conflict of Interest:** NIL

**REFERENCES**


FPGA based Abnormality Classification in Kidney Ultrasound Images using KNN

B. Vijayakumari¹, S. Rashmita²
¹Assistant Professor(SL), ²PG Student, Department of ECE, Mepco Schlenk Engineering College, Sivakasi, India

ABSTRACT

Ultrasound imaging has been widely used for diagnosing the internal abnormalities. Tele-radiographers are lacking nowadays to provide accurate diagnosis of the presence of abnormalities. To overcome this issue, Teleradiology paved a new way for the online access of the doctors around all parts of the world. Frequent access through online is a bottleneck problem. So, CAD based technique is implemented in VIRTEX-6 FPGA platform in order to clearly classify the presence of the abnormality. Manual intervention is reduced in this case. The proposed algorithm involves five steps: pre-processing segmentation, feature extraction, feature selection and classification. Based on selected features, the classification is made using KNN Classifier. Good range of specificity is achieved which is comparable with the existing algorithms. The specificity for normal, cystic and stone kidneys is 95, 80 and 75 respectively. The proposed method produces far higher accuracy when compared with SVM using linear, RBF and polynomial kernel. But it shows a bit lesser value when compared with SVM using MLP kernel.

Keywords: Ultrasound, speckle, KNN, FPGA, SVM.

Introduction

Ultrasound imaging is used for preliminary diagnosis. It is done by exposing a part of body to the high frequency sound waves. Ultrasonography (US) is an advantageous technique when compared to Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Intravenous Urography (IVU), and Angiography (AG). It is the safe and the least invasive technology for diagnosis. The internal organs such as liver, spleen, uterus, ovaries and focius in pregnant ladies are clearly visible using this non-invasive technology. The radiographers freeze those US images in order to view clearly and also for accurate diagnosis¹. The number of tele radiographers are decreasing nowadays. It led to mis predictive diagnosis in ultrasound imaging technology. Due to this serious issue, Teleradiology has been introduced. In Teleradiology, the radiographers may not be frequently available. It creates a bottleneck problem. This issue can be resolved by using Computer Aided Diagnosis (CAD)². It involves 5 stages a) Pre-Processing b) Segmentation c) Feature Extraction d) Feature Selection, e) Feature Classification-Processing is the initial step carried out in image analysis in order to reduce the speckle noise³. Speckle noise is mostly present in medical images⁴. Wavelet transform is applied in order to denoise the image. Segmentation is performed in order to extract the desired region of interest⁵. Based on selected features, the classification is made using KNN Classifier for normal, cystic and stone ultrasound kidneys images⁶. The KNN Classifier is simulated and implemented in VIRTEX-6 FPGA platform. A hardware resource utilization has been made for classification of normal and abnormal ultrasound kidneys has been presented.

Proposed Methodology

A. Pre-processing: Image pre-processing is the initial step made for accurate analysis¹. The speckle noise is the noise which is commonly present in all medical images. Discrete Wavelet transform is applied to remove the speckle noise. Three levels of decompositions are performed here. Threshold is applied on these three levels. The denoised image is obtained by applying inverse discrete wavelet transform to the resultant wavelet coefficients.

B. Segmentation: Manual segmentation is performed here. The points are marked manually along the contour of the kidney⁸. In order to get smooth contour, cubic spline interpolation is performed.
C. **Feature Extraction:** Features are extracted from the segmented region through manual segmentation. There are three different kinds of features. a) Adaptive features, b) Histogram features and c) Haralick features. Adaptive features cannot be generalized, since it varies from person to person. The first order statistical features in order to recognize the organ is obtained through histogram. Mean, Variance, Skewness, Kurtosis, Energy and Entropy are the histogram features. The other name for Haralick features is gray level co-occurrence matrix (GLCM). Autocorrelation, Contrast, Cluster prominence, Correlation, cluster shade, average, Sum of squares, Sum variance, Difference variance, Sum entropy, Difference entropy, Information measure of correlation and Inverse difference moment normalized are the Haralick features.

D. **Feature Selection:** The intensity distribution of an image is obtained through histogram which includes the above mentioned 5 features. Similarly, 16 features are extracted from Haralick. The most distinguishable features are selected in order to classify the images. Out of these Skewness, Kurtosis are selected among Histogram features and Sum of squares, Sum average and Cluster shade is selected from Haralick features. Totally, 5 features are selected for further classification rather than comparing all these features. These features are calculated as follows,

\[
\text{Kurtosis} = (1/M) \\
\text{Skewness} = (1/M) \\
\text{Sum average} = (i) \\
\text{Sum of squares} = P(i, j) \\
\text{Cluster shade} = \Sigma_{ij} P(i, j)
\]

where \(M\) → Total size of the row  
\(N\) → Total size of the column  
\(\mu\) → Mean  
\(\sigma\) → Standard Deviation

E. **KNN Classification**

The multi-dimensional feature space consists of vectors, each with a class label. Storing of the vectors and class labels are performed in training phase. There are three types of distance metrics in K-nearest neighbour algorithm. The Euclidean distance is calculated in this experimentation. It is calculated as follows,

\[
D(X, Y) = \ldots (6)
\]

The minimum distance is computed among all the images. The conditions for classification in FPGA are as follows,

00 → Normal Kidney  
01 → Cystic Kidney  
10 → Stone Kidney

For normal and abnormal classification of the image, 25 normal and 50 abnormal image features
are analysed. 15 normal and 30 abnormal are used for testing. To detect the cyst or stone region in an abnormal image, KNN classifier is trained with 15 cyst and 15 stone kidney images and tested with 10 cyst and 10 stone images. KNN Classifier uses Euclidean distance as the base element to classify the images.

Based on the conditions specified, KNN Classifier checks for the minimum distance and the value corresponding to that minimum (above specified conditions) is obtained. Based on that value, it is easy to say whether it is normal or cyst or stone ultrasound kidney. The system architecture of CAD is shown in Fig.1. The first four processes are done using MATLAB 2018a. The classification part is done in FPGA. Both simulation and implementation are performed using FPGA. KNN Classifier is used in this experimentation.

It is a classifier which classifies based upon the minimum distance. The Euclidean distance takes the difference between the testable feature and the trained feature. The difference values are squared and then they are summed up. From that values of each image, the minimum value is taken. That minimum will be considered as the minimum distance. To make predictions with KNN, a metric is to be defined for measuring the distance between the query point and the trained images. One of the most popular choices to measure this distance is known as Euclidean. The Euclidean distance is defined in equation (6). denotes the input test feature. denotes the trained features of the image. In this experimentation, 5 optimized features are taken. So, varies from 1, 2, 3, 4, 5.

The feature involves Sum average, Sum of squares, Cluster shade, Kurtosis and Skewness. These 5 features are optimized features extracted in order to train the FPGA. Comparison is made between the test features and the input features based upon the minimum distance. As shown in Fig.2, many features are extracted from the segmented kidney region. Among that 5 optimized features are taken into account. These features will be in floating point unit (FPU). It is then converted into its decimal equivalent. FPGA requires input in the form of either 0 or 1. So, the decimal equivalent values are then converted into its binary equivalent. It is then fed as input to the classifier. Those input features will get trained well using FPGA platform. The test feature is then loaded as input to the classifier. Minimum distance is determined and the classification is done efficiently.

\[
\text{Euclidean distance} = \sqrt{\sum_{i=1}^{n} (x_i - y_i)^2}
\]

F. Architecture of KNN: The input features are loaded and well trained in FPGA. In this experimentation 5 features are used. It requires subtractors, multipliers and adders based on the number of images. The test feature for an ultrasound kidney image is loaded. The subtractor subtracts the test feature and the trained feature of an image. Each subtracted value of an image are squared up and then summed up together. Similar operation is performed for all images. The minimum value among them is chosen. It is considered as the minimum distance. The minimum distance indicates that the corresponding class matches with the tested class. Based on the given conditions, 00 normal, 01 cyst, 10 stone, the corresponding value for that class is displayed in FPGA. Classification is done better by using Euclidean distance. The KNN architecture is shown in Fig.3.
Results and Discussion

The results for pre-processing, segmentation, software implementation using MATLAB and hardware implementation using KNN Classifier are discussed in this section. From the pre-processing technique better resolution is achieved. The preprocessing, segmentation steps are done using MATLAB software and their results are shown here. Similarly the hardware implementation of KNN is done using VIRTEX-6 FPGA Kit.

Some of the input ultrasound images from the database includes Normal Kidney, Cystic Kidney, Stone Kidney are shown in Fig.4

![Figure 4: (a) Normal Kidney (b) Cystic Kidney (c) Stone Kidney](image)

Image is read and processed using XILINX ISE 14.6. The thresholding and inversion operations are performed by converting. bmp file into hex file using MATLAB R2018a. Then the hex file is called and simulated in XILINX ISE 14.6. The thresholded and inverted image of normal kidney is shown in Fig.5

![Figure 5: Reading and Processing the image](image)

The image is preprocessed using Daubechies wavelet transform. The denoised image of the normal kidney is shown in Fig. 6

![Figure 6: (a) Noisy Kidney (b) Denoised Kidney](image)

Manual segmentation is performed over the denoised US kidney. Cubic spline interpolation is performed in order to get a smooth contour. Segmentation of normal kidney is shown in Fig.7

![Figure 7: (a) ROI Extraction (b) Segmented Kidney](image)

The features are extracted from the segmented region and 5 optimized features are selected for further analysis. The feature values obtained will be floating point in nature. It is converted into its binary equivalent. These four processes are done using MATLAB 2018a. Then these features are fed as input to FPGA. The kit used in this experimentation is VIRTEX-6. The KNN classifier\textsuperscript{13,14} classifies the images based on the Euclidean distance. The simulation results of KNN Classifier is shown in Fig.8
Figure 8: Simulation Results of KNN Classifier

The RTL schematic view is shown in Fig. 9

Figure 9: (a) Schematic View (b) Internal Block View

The KNN classifier is implemented in Xilinx ISE 14.6, and the device utilization summary is shown in Table 1.

<table>
<thead>
<tr>
<th>Slice Logic Utilization</th>
<th>Used</th>
<th>Available</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Slice Registers</td>
<td>5,985</td>
<td>1,60,000</td>
<td>3%</td>
</tr>
<tr>
<td>Number of Slice LUT’s</td>
<td>35,617</td>
<td>80,000</td>
<td>44%</td>
</tr>
<tr>
<td>Number of bonded IOB’s</td>
<td>63</td>
<td>600</td>
<td>10%</td>
</tr>
<tr>
<td>Number of occupied slices</td>
<td>12,170</td>
<td>20,000</td>
<td>60%</td>
</tr>
<tr>
<td>Memory</td>
<td></td>
<td>461300kb</td>
<td></td>
</tr>
<tr>
<td>Gate delay</td>
<td></td>
<td>16.433 ns</td>
<td></td>
</tr>
</tbody>
</table>
The normal falls under normal for 6 images. The cyst falls under cyst for 7 images. The stone falls under stone for 7 images. Remaining images are misclassified. It is shown in Table 2.

Table 2: Confusion Matrix for Ultrasound Kidneys

<table>
<thead>
<tr>
<th>Actual Class</th>
<th>Normal</th>
<th>Cyst</th>
<th>Stone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predicted Class</td>
<td>TP</td>
<td>FN</td>
<td>FN</td>
</tr>
<tr>
<td>Normal</td>
<td>6</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Cyst</td>
<td>1</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Stone</td>
<td>0</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

After computing the confusion matrix, the comparison between SVM and KNN based on the accuracy is shown in Table 3.

Table 3: Comparison of SVM and KNN based on accuracy

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SVM (linear)</th>
<th>SVM (RBF)</th>
<th>SVM (Polynomial)</th>
<th>KNN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>66.67</td>
<td>58.33</td>
<td>41.66</td>
<td>77.33</td>
</tr>
</tbody>
</table>

The accuracy of KNN is higher when compares to SVM using linear, RBF and polynomial kernel. The parameters such as specificity, sensitivity/recall, f-measure, accuracy and precision are calculated. It is calculated for normal, cystic and stone kidney. The computed values are shown in Table 4.

Table 4: Comparison of performance measures of normal and abnormal kidneys

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Normal</th>
<th>Cyst</th>
<th>Stone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision</td>
<td>85.714</td>
<td>63.636</td>
<td>58.33</td>
</tr>
<tr>
<td>Sensitivity/Recall</td>
<td>60</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Specificity</td>
<td>95</td>
<td>80</td>
<td>75</td>
</tr>
<tr>
<td>F-Measure</td>
<td>70.5881</td>
<td>66.66</td>
<td>63.63</td>
</tr>
<tr>
<td>Accuracy</td>
<td>83</td>
<td>76</td>
<td>73</td>
</tr>
</tbody>
</table>

From the above tabulation, it is observed that good range of specificity is achieved in KNN Classifier which is comparable with the existing algorithms. Generally, the Precision and Recall are inversely proportional in nature. From the table, it is observed that, it is obeyed in the experimentation. The proposed method produces better accuracy of 83% for normal images and a bit comparatively lesser accuracy of 76% and 73% for cyst and stone respectively. This may be due to the fewer databases.

Conclusion

The proposed method includes wavelet-based noise removal and segmentation of kidney region, feature extraction, selection and supervised classification. Experimental result shows that the KNN Classifier provides better classification of normal and abnormal images. The normal kidney is classified with 83% of accuracy. The cystic kidney is classified with 76% of accuracy. The stone kidney is classified with 73% of accuracy. Good range of specificity is achieved in KNN Classifier which is comparable with the existing algorithms. The accuracy rate of proposed method is slightly lower than SVM using MLP kernel, but it is far higher than SVM using Linear, RBF and Polynomial Kernel.

Acknowledgment

The authors would like to thank Department of ECE, Mepco Schlenk Engineering College, Sivakasi for providing the facilities to carry out this work.

Ethical Clearance: Taken from the committee

Source of Funding: NIL

Conflict of Interest: NIL

REFERENCES


4. Tanzila Rahman, Mohammad Shorif Uddin. Speckle Noise Reduction and Segmentation of


Image Segmentation Techniques Implemented in Medical Images-A Research Review

Jagadeesh K.¹, A. Rajendran²
¹Ph.D. Scholar, Department of Information and Communication Engineering, Anna University, Chennai, Tamil Nadu, India; ²Professor, Department of Electronics and Communication Engineering, Karpagam College of Engineering, Coimbatore, Tamil Nadu, India

ABSTRACT

Image segmentation is a fundamental process of partitioning an image. Segmentation is the most essential process as well as crucial. It remains as a challenging task, due to various factors such as noise, occlusion, etc., the main aim of this paper is to understand and compare the different image segmentation algorithms and techniques widely used so far. The comparison of the algorithms will give a clear explanation about the features included in image segmentation process of medical images.

Keywords: Image segmentation, Partitioning, Noise, Occulsion.

Introduction

Segmentation is the initial process used for the partitioning of images into different parts. It will help to change the representation of an image which will be easy to analyze. It occurs as a set of regions that collectively represents the complete image. The images are scanned by Magnetic Resonance Imaging (MRI) scan (or) Computer Tomography (CT) scan. The MRI scan is preferred more than that of the CT scan because of its easy diagnosis.

The image segmentation algorithms such as K-means algorithm, K-means integrated with Fuzzy C-means (KIFCM) algorithm, Otsu's algorithm, EM, MEM (Modified Expectation of Maximum), SOM (Self Organising Map), etc., were widely used and they are compared based on their performance. These features with some important parameters are studied and compared to give a clear idea about the different techniques used for image segmentation.

Image Segmentation-Classification: The image segmentation is mainly classified into the following three types
(a) Structural segmentation
(b) Stochastic segmentation
(c) Hybrid segmentation

(a) Structural segmentation: The structural segmentation method mainly focus on the particular region or only the required region that have to be segmented.

(b) Stochastic Segmentation: The stochastic segmentation method will focus on the discrete pixel values and not the structural information of the image or region.

(c) Hybrid Segmentation: The hybrid segmentation method will include both the structural segmentation as well as stochastic segmentation.

Image Segmentation-Techniques: The most popular techniques used for image segmentation are; thresholding techniques, edge detection based techniques, region based techniques, clustering based techniques, watershed based techniques, partial differential equation based and artificial neural network based techniques etc. These all techniques are different from each other with respect to the method used by these for segmentation.

1. Thresholding Techniques: Thresholding methods are the simplest methods for image segmentation. These methods divide the image pixels with respect to their intensity level. These methods are used over images having lighter objects than background. The selection of these methods can be manual or automatic i.e. can be based on prior knowledge or information of image features. There are three basic types of thresholding.
(a) Global Thresholding,
(b) Variable Thresholding, and
(c) Multiple Thresholding

![Image Segmentation Techniques](image.png)

A locally adaptive thresholding technique that removes background by using local mean and standard deviation. Niblack and Sauvola thresholding algorithms were implemented on medical images. A comparison of Niblack and Sauvola thresholding algorithm is done. These approaches aims at removal of background noise. Niblack algorithm will reduce the background noise compared to Sauvola algorithm. The performance of these algorithms are measured using segmentation parameters PSNR, Jaccard Similarity Coefficient. The result of the Niblack algorithm will be better than the Sauvola algorithm.

2. Edge Detection Based Techniques: The edge detection techniques were well developed techniques of image processing. The edge based segmentation methods were based on the rapid change of intensity value in an image because a single intensity value does not provide good information about edges. Edge detection techniques locate the edges where either the first derivative of intensity was greater than a particular threshold or the second derivative has zero crossings. In edge based segmentation methods, first of all the edges were detected and then connected together to form the object boundaries to segment the required regions. The basic two edge based segmentation methods are: Gray histograms and Gradient based methods. To detect the edges the basic edge detection techniques like sobel operator, canny operator and Robert’s operator etc was used. Result of these methods was a binary image. These are the structural techniques based on discontinuity detection.

These techniques were suitable for many medical image applications. These techniques will be applied for object recognition and detection.

3. Region Based Techniques: The region based segmentation methods were the methods that segments the image into various regions having similar characteristics. Basically there are two techniques based on this method.

(a) Region growing methods: The region growing based segmentation methods were the methods that segments the image into various regions based on the growing of seeds (initial pixels). These seeds will be selected manually (based on prior knowledge) or automatically (based on particular application). Then the growing of seeds were controlled by connectivity between pixels and with the help of the prior knowledge of problem, this can be stopped.

(b) Region splitting and merging methods: The region splitting and merging based segmentation methods will use two basic techniques i.e. splitting and merging for segmenting an image into various regions. Splitting stands for iteratively dividing an image into regions having similar characteristics and then merging contributes to combining the adjacent similar regions.

4. Clustering Based Techniques: Clustering was a process where a data set is replaced by clusters, which are the collections of data points
5. Fuzzy Based Techniques: The performance of the various fuzzy based algorithms for medical image segmentation was made. Fuzzy c-means (FCM) algorithm has proved its effectiveness for image segmentation. However, still it lacks in getting robustness to noise and outliers, especially in the absence of prior knowledge of the noise. To overcome this problem, different types of fuzzy algorithms were introduced with and without spatial information for medical image segmentation. The algorithm utilizes the spatial neighbourhood membership values in the standard kernels were used in the kernel FCM (KFCM) algorithm and modifies the membership weighting of each cluster.

The available various fuzzy algorithms were tested on brain MRI which degraded by Gaussian noise and Salt-Pepper noise. The performance was tested in terms of score for the clustering of images. The performance of the various fuzzy based clustering algorithms were evaluated for medical image segmentation. The performance was tested on brain MRI which degraded by Gaussian noise and Salt-Pepper noise demonstrates in which the MKFCEM_S1 performs more robust to noise than other existing image segmentation algorithms from FCM family.

6. ANN Based Techniques: The artificial neural network based segmentation method simulates the learning strategies of human brain for the purpose of decision making. Now days this method was mostly used for the segmentation of medical images. It was used to separate the required image from background. A neural network was made of large number of connected nodes and each connection has a particular weight. This method was independent of PDE. In this, the problem was converted to issues which are solved using neural network. This method has basic two steps: extracting features and segmentation by neural network.

The design of the system was observed to be ideal for performing as a Computer Aided Detection (CADe) system for detection of lung cancer. It can be helpful in assisting radiologists in the detection process by validating their diagnosis to prevent incorrect diagnosis. We can also observe that the system can perform even better if it was trained using larger databases and may be used for detecting lung cancer without the presence of radiologists in the future.
Image Segmentation Techniques–A Comparision: Table-1 shows a comparison of segmentation techniques with its principle, advantages, disadvantages and applications.

Table 1: Comparison of different image segmentation techniques

<table>
<thead>
<tr>
<th>Segmentation Techniques</th>
<th>Principle</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thresholding Based</td>
<td>Threshold values are found based on the image histogram peaks</td>
<td>Simple, Previous information is not necessary</td>
<td>Dependent on peaks, spatial details are not considered</td>
<td>Deep learning algorithms, convolutional networks</td>
</tr>
<tr>
<td>Edge Based</td>
<td>Discontinuity detection</td>
<td>Contrast between objects is good</td>
<td>too many edges detection may be wrong</td>
<td>Lane edge detection, Canny algorithm, CAD</td>
</tr>
<tr>
<td>Region Based</td>
<td>Transformation of partitioned image into homogeneous regions</td>
<td>Highly immune to noise, easy to define similarity criteria</td>
<td>Highly expensive mainly for time and memory</td>
<td>Region growing, Region splitting and merging</td>
</tr>
<tr>
<td>Fuzzy Based</td>
<td>Support Vector Machine (SVM), Fuzzy C-Mean (FCM), Conventional Neural Network (CNN) and CAD-FCM</td>
<td>Fastest method, more stable</td>
<td>Computational complexity is high</td>
<td>Clinical aided diagnosis (CAD)</td>
</tr>
<tr>
<td>Clustering Based</td>
<td>Divided into homogeneous clusters</td>
<td>More useful for real problems</td>
<td>Determining membership function is Complex</td>
<td>Seed point selection algorithms</td>
</tr>
<tr>
<td>ANN Based</td>
<td>Decision making is based on the simulation</td>
<td>Complex written program is not necessary</td>
<td>Waste of time in training</td>
<td>Supervised and Un-supervised learning</td>
</tr>
</tbody>
</table>

Conclusion

In this review of different image segmentation techniques, various image segmentation techniques were described and compared. These techniques were suitable for many medical image applications. Further these techniques can be used for object recognition and detection. In medical images these techniques can be used to detect cancer. Thus we can say clearly that various methods were suitable for various types of image applications. Image segmentation is affected by lots of factors, such as: homogeneity of images, spatial characteristics of the image continuity, texture, image content. Therefore there is no single method which can be considered good for all type of images, nor all methods equally good for a particular type of image. Due to all above factors, image segmentation remains a challenging problem in image processing and computer vision and is still a pending problem in the world.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES


4. Eman Abdul-Maksoud, Mohammed Elmogy, Rashid Al-Awadi. Brain tumour segmentation
based on hybrid clustering technique. Egyptian informatics journal Elsevier. 2015.


Detection of Brain Tumor using Back Propagation Algorithm through MRI

A. Sridevi¹, T. Sabitha²

¹Associate Professor; ²PG student, M. Kumarasamy College of Engineering (Autonomous), Karur

ABSTRACT

Radiology is a vast subject and requires more knowledge and understanding for exact diagnosis of tumor in medical science. In this work, a meningioma segment and detection approach is designed using MRI sequence images as input image for defining the tumor point. This experiments is a difficult to the large diversification in the existence of tumor tissues related to various inmate and most of the cases similarity within the normal tissues makes the task difficult. The main impartial is to categorize the brain into the presence meningioma or a healthy brain. proposed system has following main steps, Edge based Contourlet Transformation for registration process carried out as pre-processing step, next segmentation of tumor point using region- expanding segmentation, for aspect extraction step, two types of texture features are combined Otsus Thresholding, k-means and Local Binary markings texture aspect for efficient meningioma detection and finally for classification adopting neural network methods is imported out. The proposed approach implements a novel procedure which uses a back propagation detection of meningioma from Slices scan image. The combination of GLRLM and CS-LBP features outperformed well in discriminating between normal and affected tumor tissue and also for classification a back propagation algorithm are used and attained the better classification accuracy. The proposed algorithm is implemented using Mat lab, for various MRI sequences the experimental results are obtained for Image Registration and segmentation using point of growing. The Segmented images are corelate with victims data base and classify it as severe or Benign using ANN classifier.

Keywords: Merciless tumor; benign tumor; backpropagation; otsus thresholding, k means clustering.

Introduction

Image processing is a methodology which is capable of converting an image into discrete form and it performs certain operations on image, to achieve an enhanced image or to extract some vital information from it, identical to DSP. In image processing, input is an picture (may be a video frame, a photograph in any format) and the output is picture or the characteristics of the input image. Tumor segmentation usually considers an picture 2D, wave while processing¹. It is one among the emerging technologies, with its branches of application wide spread into several domains of business. The prediction method is a core research area in engineering and it also acts as a thrust area in other disciplines of computer science. Researchers are in need of image processing; as it offers real world applications and the results derived from image processing algorithms are also made available to the hands of its user. Generally, medical images obtained from hospitals are in DICOS-Communications and Digital Imaging in Medicine format. These picture layout are quite huge in size and require higher memory space for storage. For portability of these data, they are converted into GIF, BMP, JPEG, TIF, PNG file formats. Analysis of images in DICOS pattern is a tedious process and the pictures are converted into any of the above said file format, and they are used worldwide. Image processing is extended to such medical image diagnosis so as to identify the pathologies present in our body, especially the pathologies present in human brain that are complicate to diagnose. The work focuses upon this particular issue and is organized to resolve it. Meningioma using Slices scan images is popularly used in the biomedical field for identification and visualization of finer details of the interior parts of the body. This technique is significantly used for detecting the variations between tissues and resulted to be a better technique when correlated computed tomography (CT). Thus Slices technique is
specially used for the detection and identification cancer and meningioma imaging. Ionizing radiations are used for CT scan and magnetization is used for MRI scan, here a strong magnetic field is produced to adjust the nuclear magnetization and then uses radio frequencies for the coordinate of the magnetization to identified by the image scanner. 

![Generic flow diagram of brain tumor detection and analysis](image)

Figure 1: Generic flow diagram of brain tumor detection and analysis

That signal generated is furtherhandled to derive the information from body. By comparing both the types of images MR image is safer than CT scan image because it is harmless for human body. In the previous methods, in radiologist used for meningioma identification need to manually discover the MRI pictures and tries to identify and point the abnormalities available in the MRI picture. The figure 1 presents Generic flow diagram in MRI tumor detection and analysis In order to locate the abnormalities consumes time and need lot of efforts. So, there requires an assistant tool which helps in detecting the presence of tumor in the Slices image of brain and stage accurately. Thus detection of tumor in brain plays a curial and tough job in the range of medical picture processing. The separation of damaged or infected part from the brain along with its shape, size and boundary is known as identification of meningioma.

The subsist of the paper is described as. The review in literature is done in Section III. The theoretical design and the phases of the scheme are described in Section and the experimental results of the computerized system are documented in Section IV. Finally, future work and conclusions are written Section V.

**Literature Review**

Segmentation for Brain tumor is described by various researchers. Likewise, proposed a concept of super pixel classification based optic disc and optic cup. In early stages, the Brain tumor leads in serious effects and faces lot of difficulties for treatment. They discussed about the bed fort and its effects on various people variation between age, sex and different date. As per the survey carried out by prevalence of brain tumor varies with the region and race. It advised that there is no specific cutoff point for intraocular pressure (IOP) which brain tumor creates, although expanding IOP was a critical hazard factor for Brain tumor.

Mentioned that primary hazard components of brain tumor are hoisted IOP applied by watery diversion, family history of brain tumor (genetic), astigmatism or partial blindness, brain tumor in the other eye, retinal separation, injury to the eye, diabetes, pigmenitary scattering disorder, slender points, low fundamental circulatory strain, headache migraines or visual headaches, raynaud’s disorder, blood thickening, irregular visual field tests, undesirable optic nerve, corneal dystrophy and pseudo shedding.

Stated that brain tumor effects on aged 40 years or older people as per the survey around TamilNadu, southern part of India. They conducted the survey based on the aravind Comprehensive Eye camp around rural population in the state. India is the second most populated nation among the world. The effect of visual failure and visual deficiency from brain tumor is in all likelihood expensive. In spite of its general wellbeing essentialness, there has been constrained information accessible on the pervasiveness of brain tumor and conceivable hazard factors for brain tumor in India. Past populace based investigations from India have announced the predominance of brain tumor in urban populaces. There has been no investigating on the pervasiveness of brain tumor in provincial populaces from India. Also, in these earlier examinations, perimetry was restricted to the individuals who satisfied certain conditions like IOP or brain plate measuring.

Portrayed diabetic meningoma as an endless disease caused by inconveniences of diabetes mellitus and establish the essential driver of visual impairment among individuals of working age in created nations. As diabetic retinopathy is difficult sickness recommended that laser photocoeagulation can forestall significant vision misfortune if identified in beginning times.
doctor-patients can’t manifestations until their visual misfortune creates, diabetic patients require a yearly MRI-fundus examination.

Brought up early recognition and consequent treatment is fundamental to anticipate visual harm. With the new advances in advanced modalities for retinal imaging, there is a dynamic need of picture handling instruments that give quick and solid division of retinal anatomical structures. Initiated a model for timolol maleate controlled release ocular drug delivery system for the treatment of brain tumor. Likewise, most of the researchers focused on applying the retinal image and processed for diagnosing. It minimizes the concept of complexity and helps doctor to predict the disease in early stage.

In early stages, the classical segmentation algorithms like thresholding, edge detection and region growing techniques are resulted with some limitation. It is difficult to find the concept of boundary detection correctly because it gets varied during the edge detection. Hence, the smoothness is mismatched while segmenting the image. Hence, various researchers focused on applying the concept of segmentation retinal images like Local entropy thresholding based fast retinal vessels segmentation by modifying matched filter, active contour model based on extended feature projection, adaptive threshold based algorithm Active Contours techniques for automatic detection of brain tumor.

Proposed System

The basic block diagram for brain tumor detection and classification consist of a set input data called as MR images, these images are fed to the pre-processing block where the images are smoothened and noise will be removed by the use of different algorithms. Next the images undergoes into the process segmentation where the precise boundary is obtained depending on the area of interest with human interaction or by automatic segmentation without human interaction. The segmented region’s pixels are extracted by feature extraction algorithms to compare the extracted pixel with the victim case for detecting the brain region is affected or not to classify into severe or benign.

There are two major types of image classification methods. One is unsupervised which is programmed by software and supervised which is known as human-guided classification. Unsupervised classification is the measure of the software based parameters analysis without any external affair or from the sample use to guide classifier. Here the classifier uses methods to determine which parameters or pixels of an image are similar and group them into particular classes. In this type of classifier the user can provide the classification algorithms as inbuilt software which will be used for grouping the upcoming images into the particular classes.

The input image to the Registration phase will be the images produced by the Noise Reduction phase. The purpose of registration in this framework is to allow the use of multiple imaging modalities (co-registration), and the use of information derived from the alignment of a template in a standard coordinate system (template registration). Therefore, the output of the registration phase will be images in the different modalities that have been aligned with each other and have been additionally aligned with a template in a standard coordinate system. The registration methods should also not rely on segmentation, or even the automatic recognition of specific landmarks, since the presence of large tumors can interfere significantly with these operations. These restrictions indicate that intensity or information-based registration algorithms are most appropriate, and fortunately there is an abundance of research into these methods for medical image registration. That signal generated is further handled to derive the information from body. By comparing both the types of images MR image is safer than CT scan image because it is harmless for human body. In the previous methods, in radiologist used for meningioma identification need to manually discover the MRI pictures and tries to identify and point the abnormalities available in the MRI picture.

![Figure 2: Proposed System](image-url)
Segmentation of a medical image is the process of dividing an image into different clusters, regions or categories, which are equivalent to different objects or parts of objects. An image which contains the pixels is allocated to one of these categories\(^\text{17}\). A best segmentation is typically one in which:

- pixels with the similar properties have similar grey scale of multivariate values and form a region boundary,
- The neighboring pixels in different categories have dissimilar gray level values.

Segmentation process involve from image preprocessing to the image analyzing. As the image segmentation, the target information based on segmentation, the feature extraction and other parameters measured to convert the original image into the discrete and compact form, which provides a high-level image to analyse and understand for diagnosis process here Otsu binarization and k means clustering algorithms complete the segmentation\(^\text{18}\).

To reach a minimum of dissimilarity function there are two conditions. These are given in Equation 1 and Equation 2.

\[ C_i = \frac{\sum_{j=1}^{n} \mu_{yi} x_j}{\sum_{j=1}^{n} \mu_{yi}} \]  \hspace{1cm} (1)

\[ \mu_{ij} = \frac{1}{\sum_{l=1}^{c} \left( \frac{d_{lk}}{d_{ij}} \right)^{2(m-1)}} \]  \hspace{1cm} (2)

Detailed algorithm of K-means proposed by Bezdek in 1978.

\[ \frac{\partial c}{\partial w_{ik}} = ak^{-1} R_{jk}, \frac{\partial l}{\partial b_{ij}} = \delta_{ij} \]  \hspace{1cm} (3)

In the back propagation classification technique, have been proposed in which supervised classifier works as trained classifier which will compare the input data with the stored knowledge data base and the unsupervised classifier stores the important features of the respective dataset for comparing with upcoming input data feature\(^\text{19}\). Here we have supervised classifier trained with victim dataset features to compare with feature extracted from the segmented MR image detailed in equation 3.

### Result and Discussions

Initially, the input image is processed with the super pixel generation (figure 3(a)) and identify the Glare area (figure 3(b)) which is not visible in the framed pixel is analysed. It is important to detect the glare image because there are relatively constant aspects of digital cameras. The traditional methods to glare detection are generally relying on one or two simplistic image properties. But this research utilizes various concepts to adapt the segmentation process. Instead of adaptive and threshold concepts are combined with the features. It is displayed in the figure 3(a).

![Figure 3: (a) source image (b) grey scale image](image3)

Chan–Vese (CV) active contour model. Digital Retinal Images for Optic Nerve Segmentation Database (DCIOS) consists of optic nerve head segmentation from digital retinal images dedicated to the research\(^\text{13}\). It is considered to verify the concept of segmentation based on proposed Fuzzy k-based clustering. The input samples are represented in the figure 4.

![Figure 4: (a) filtered image (b) OTSU binarization image](image4)
Figure 5: MRI filter segmentation images

Figure 6: (a) cluster image (b) segmented tumor

Figure 7: Classification Result

The experiment is carried out for 15 different input sample images to verify and validation the brain tumor detection and classification. Figure 6 a) and b) carried for two different set of images, the first row (a) represents the registered image for selected source and destination images, next step will be segmentation for brain tumor region detection, as shown in the second column. Finally the classification result is displayed using message box as shown in Figure 7, with two samples; one image is classified as Benign, the other Malignant.

Conclusion

This article initially analysed various brain tumor based detection methodologies. Since, less number of researchers focused on this and still the medical department demands recent advancements to interact the segmentation. With this motivation, this research adapted segmentation process of clustering the MRI image downloaded from the Digital brain Images for Brain tumor Segmentation Database. Some traditional methods like Threshold techniques and gradient based methods are not effective when the intensity levels of the tumor cub are out of region. In such cases, there is a need to design an exact algorithm to avoid blur and also able to detect the Glare area. Here, the regions are partitioned and segmented into various RGB level histograms to achieve equalization. Since, the role of Adaptively Regularized back propagation gives high accuracy of each pre stage of segmentation. Finally, the back propagation based clustering is applied to cluster the cub region exactly. From the results it is noticed that the proposed methodology has maximum accuracy, Average F-score and expected average boundary distance. At last, the average correlation is achieved as expected. Hence, it is adaptable to any type of brain tumor diseases. In future, these concepts are adaptable for each and every real time image sequence and verify the test results.

Ethical Clearance: Taken from the committee

Source of Funding: NIL

Conflict of Interest: NIL

REFERENCES


4. A.S. Shwakshar, R. Ahmmed, Md. F.Hossain, Md.A. Rafiq. Classification of Tumors and


Smart Asthma Prediction System using Internet of Things

M. Sivaram Krishnan¹, S. Sri Ragavi², M. Siva RamKumar³, D. Kavitha⁴

¹Assistant Professor, Dept of EEE, Karpagam College of Engineering, Coimbatore, Tamilnadu, India;  
²Assistant Professor, Dept of EEE, Sri Krishna College of Technology, Coimbatore, Tamilnadu, India;  
³Assistant Professor, Dept of EEE, Karpagam Academy of higher Education, Coimbatore, Tamilnadu, India;  
⁴Assistant Professor, Dept of EIE, SNS College of Technology, Coimbatore, Tamilnadu, India

ABSTRACT

Now a days about 334 million persons crossways the world are pain from asthma. The number of people distress from asthma has been increasing harshly over the years, pollution being one of the main reasons. However monitoring contamination is a wide subject, but ending oneself from asthma is an calmer method available. It is vital to keep track of what triggers asthma attack in a patient, because indications do not occur right after the exposure to the producing parameters. Afterwards, the problem of persistent asthma management is introduced with a short overview of traditional disease management techniques. A review on lines to asthma tele watching is made. By the expertise, the purpose is to hold the sickness in a measured national with trivial exertion, intrusiveness and price, and measure patient’s disorder accurately. The delay in attack occurs depending on how much the person is sensitive to the factor. Therefore we attempt to suggest a perfect of a smooth asthma extrapolation organization using Internet of Things.

Keywords: Asthma, Sensor, Detector, Wearable, Temperature, Laser.

Introduction

Organized with diabetes and lasting hearth diseases, chronic pulmonary diseases are mostly common group of chronic diseases. Amongst pulmonic illnesses, asthma is only the vastly denoted. It is predictable that 300 million publics global hurt from asthma. Allowing to Global Burden of Disease Study (GBD) undertaken in 2008-2010, the number of people suffering from asthma in the world may be as high as 334 million. Kind of asthma is resolute by cause of respiratory antipathy: affected by asthma (atopic, extrinsic, affected by immunologic incentive of an antigen), basic (no affected, encouraged by pollution, actually or chemically), workout encouraged, medicine made asthma, accusative asthma and asthmatic bronchitis. Now this sense we frequently importance on the adverse asthma, but approaches projected apply to all methods of asthma which contain existence of wheeziness. The vilest unnatural are the aged persons between 75-79 years and puberty (ages 10-14) in terms of debility and quick demise. Asthma is a long-lasting sickness which reasons anxious sniff along with coughing and wheeziness. There may different elements which may initiate an asthma attack, which disagrees from person to person. Some of the corporate elements which initiate asthma are:

- Impurities
- Nutrition and nutrition spices
- It can ensue later an workout.
- Smoldering and biochemical fumes
- Sinusitis
- Outside allergens, such as pollens since lawn, plants and wildflowers
- Inside allergens, such as domesticated dander, dirt bugs and frame.

Therefore the type exchanges present to several safe zone free since elements which can activate the attack. We suggest a scheme and process which will help an asthma enduring to escape some sites which cause inhalation trouble. The Fig 1.1 shows the inflammation of the lungs in an asthma patient.
Literature Survey

In this paper they have used an indoor air quality sensor called as foobot which senses the air quality and alerts the user if there are any changes in there is an increase. Here the foobot sensor can only sense the air quality of the indoor environment and also the price of foobot sensor is high. So in order to rectify this we go for the next paper which uses temperature sensor and humidity sensor and carbon dioxide sensors to get the values of the temperature, humidity and carbon dioxide respectively and it uses PIC microcontroller and Zigbee which is a communication protocol. But Zigbee is a close proximity communication protocol. In order to overcome this we go for a model where we use flow meter in order to determine the vital signs of the patient and it uses Bluetooth to communicate the information to the user.

In order to use a more reliable method we have used temperature sensor, pollen sensor and humidity sensor that are connected to the arduino. The sensors collect these data and communicate it with the arduino. Our method is incorporated with IoT. Wifi is connected to the cloud storage through which the data is supplied to the user. Hence our model is cost effective when compared to the above methods and since it uses IoT it can also be modified for further needs.

Proposed Method

We recommend an organization and a method which will help an asthma continuing to dodge some sites which reason for breath trouble. The following work has already been done: When the user takes the inhaler, automatically a signal is sent to the mobile app via cloud using android app, at the same stage by receiving the pointer the app twitches collecting various real time factor beliefs like the locality by GPS, the organization heat, heart beat etc. When the patient goes to the Doctor for consultation the app shows some analytics to help the doctor to diagnose the asthma problem. Humidity affects a person health by increasing asthma attack chance. We can use weather report for Humidity. In place of certain persons somatic doings like training also cause asthma. Thus when the person is running or walking hard and crossing the normal threshold value of regular walk, we can send a warning notification. We can also alert that person to use mask whenever there is any kind of abnormality in environmental situation such as a lot of dust is being generated at a construction also be affected the asthma person.

Block Diagram

Hardware Content

A. Arduino: The Fig 1.2 shows the block diagram of the setup where the Arduino is exposed foundation processor hardware and software business, scheme, and operator municipal that projects and microcontrollers and microcontroller kits for building digital devices and communicating stuffs that can sense and switch objects in the bodily world. The scheme’s crops are scattered as open-source hardware and software, Arduino panel projects use a diversity of microchips and supervisors. The sheets are complete with groups of geometric and conforming input/output (I/O)
pins that may be interfaced to overflowing growth sheets (shields) and additional circuits. The panels feature serial buildings limits, counting Universal Serial Bus (USB) on some models, which are also used for filling programs from private computers. The microcontrollers are classically reflex using a tongue of topographies from the software enterprise languages C and C++.

**B. Pollen detector (ps2 pollen sensor):** This pollen detector detects pollens by the principle of scattering of light. Conventional Pollen counting has been time-consuming work so far. Though, a being containe nowadays on announcement scrutinize the attendance of pollen subdivisions using pollen instruments by captivating lead of real time examination that is obtainable anyplace. It uses one light emitter and two light receptors to distinguish pollen from other particles on the basis of two factors, “scattered light intensity” and “degree of polarization”. Thus the asthma detection system successfully detects presence of pollen. Pollen total material can be completed existing lacking stay by attractive gain of the actual period study. Built-in Heater prevents dew Optical unit and circuit are fully covered with plastic case, and built-in heater keeps the sensor away from dew. The Fig 1.3 shows the pollen detector\textsuperscript{10, 11}.

**C. Humidity sensor:** Humidity sensing is identical significant, particularly in the regulator schemes for manufacturing procedures and humanoid luxury. Hot steamy air is weightier and tough to exhale. Hot air can bother the airline and lead to irritation. Over at the similar period, humidity in the air can bore oxygen. Thus for certain asthma patient it is not a problematic. The insufficient humidity can main to irritation of airlines too. Thus, some person’s involvement asthma indications when air is excessively dry (during winters). So here is a need for a moisture sensor. CL-M53R-a small structure wetness sensor/SHINYEI HUMENT serves this purpose. CL-M53R sensor is lead free sensor and environmental safe. Thus the system also detects humidity percentage. The Fig 1.4 shows the humidity and moisture sensors respectively\textsuperscript{12, 14}.

**D. Temperature sensor:** A temperature sensor is a method, classically, a thermocouple or RTD that delivers for temperature dimension done an electrical motion. A thermocouple (T/C) is completed from two different metals that produce electrical voltage in direct amount to changes in infection. An RTD (Resistance Temperature Detector) is a variable resistor that will change its electrical resistance in direct proportion to changes in temperature in a precise, repeatable and nearly linear manner.

**E. Heartbeatsensor:** The heartbeat sensor is founded on the opinion of photo phlethysmography. It actions the amendment in capacity of lifeblood finished any structure of the body which reasons a modification in the light strength finished that organ (a vascular region). In case of applications where heart pulse rate is to be monitored, the control of the pounds is extra vital. The flow of clan capacity is certain by the rate of heart pounds.
and since light is immersed by blood, the signal pulses are agreeing to the heartbeat pulses. There are dual kinds of photo phlethysmography:

**Transmission**: Light released since the sunny releasing ploy is spread finished any vascular area of the figure like earlobe and conventional by the sensor.

**Reflection**: Light released from the nimble producing device is imitated by the areas.

**F. Cloud**: Distribution and Storage Data. Cloud figuring, in turn, raises to allotment incomes, software, and material via a system, in this situation the Internet. The measureable is kept on bodily attendants sustained and exact by a cloud computing provider.

**G. Wi-Fi**: Like movable handsets, a Wi-Fi system types use of radio waves to spread material crossways a web. The computer must comprise a wireless connector that will interpret facts sent into a wireless signal. This same signal will be communicated, via projection, to a interpreter branded as the router.

**Simulation**

**A. Initial state**: Initially the value of the temperature is 0 when rv1, rv3 are at 0 and DHT11 is at 20. The Fig.6 shows the value of the initial values of temperature, pollen and humidity.

**B. Change in RV1**: If the value of value of rv1 is increased to 5% then there is a change in the value of the temperature sensor.

The temperature becomes 24 while Humidity and pollen values remain unchanged. The Fig.7 shows the increase in temperature from 0 to 24.

**C. Change in RV3**: Now when the value of rv3 is changed from 0 to 5 the pollen sensor value (P) increases from 0 to 51 while the temperature and humidity remain the same. The Fig.8 shows the increase in pollen value from 0 to 51.

**D. Change in DHT11**: Now when DHT11 value is increased from 20 to 25 the humidity sensor value increase to 25 while the temperature and pollen values remain the same. The Fig.9 shows the change in the value of humidity from 20 to 25.
Conclusion

We have tried to propose a model of a system which will take into consideration, the most important parameters before arriving at a conclusion whether to alert the user or not. However a challenge yet remains to integrate the entire system into one model to make it usable. The key to successful management of asthma is retaining it in the diagnosed state. Traditional methods of home management by peak flow metry and paper-diaries rely on user participation and are failing to provide objective information in times of asthmatic attacks. We focus our research on optimal design of a minimally intrusive body-worn wireless body sensor node for continuous monitoring of respiratory function. The battery operated node is working in conditions of limited energy and presence of background noise.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES


Smart Indoor and Outdoor Guiding System for Blind People using Android and IOT

S. Nivishna¹, C. Vivek²

¹PG Scholar; ²Head of the Department, Department of ECE, M. Kumarasamy College of Engineering, Karur, Tamil Nadu

ABSTRACT

For past years, there is no appropriate indoor navigation system to blind people. The main aim of our project is to find a simple method of navigation system for visually impaired people who are thinking that its hard to explore in right way while working in office or while walking on the road, and our framework gives voice recorder to convey the status of client transportation way. Voice based declaration is given by the framework utilizing WIFI and LIFI innovation. WIFI can screen the position movement of individuals in room and on streets. Obstacle identification is additionally accessible in the framework which is utilized to achieve the goal point. Thus this android application plays voice utilizing head set too.

Keywords: lifi, wifi, gps, obstacle recognition

Introduction

Now a days it is extremely troublesome for visually impaired individuals to discover their way without the guidance of some other individuals¹. They have some innovation for the outdoor purpose to guide them to find their path, in this task we are including indoor guidance also.

Visual impairment is an extraordinary inconvenience for an individual to lead their life cheerfully¹. This disability creates great problem for one in their day by day life. According to the world research, out of 8 billion overall people there are in excess of 284 million apparently weekend people and 38 million were completely outwardly hindered out of which 18 million are kids and the check is creating at an aggravating range. Hence, some course system is expected to help and guide this people³. Various investigates are being coordinated to make course system for dazzle individuals. A large portion of these progression have constraints as its test incorporates exactness, interoperability, convenience, scope which is nothing yet hard to defeat with current advancement for both indoor and outdoor course.

The framework c an exhort the customer where he/she is correct currently found, and give talked course to development to a remote objective. The apparently weekend are at huge burden for they habitually don’t have the required information for bypassing hindrances and chances and have modestly little information about memorable focuses, heading and self speed-information that is basic to found individuals investigating through normal conditions who think about these circumstances or who are investigating through new conditions dependent on external maps and verbal course. GPS way finding systems are primarily sensible for outdoor circumstances in light of the way that the beneficiaries are generally unfit to perform well in an indoor area. Procedures for relative arranging inside fuse sensors using sonar, propelled marks and accelerometers. A bit of the present GPS structure impact usage of braille comforts for customer to enter and also system yield. In any case, not all vision incapacitated can peruse braille.

To ensure that a course system will be accessible to the best degree of vision blocked people, usability is a key point for convergence of the endeavour, and talk advancement was perceived as a need feature of the structure². Further, by overriding the braille support with a talk advancement, the device will be progressively helpful and less blundering to use while walking⁴. Talk development has been being chipped away at for more than three decades, and enthusiasm for this advancement is depended upon to rise radically soon as people get to the web using mobile phones⁶. Late advances in talk affirmation development, joined with the methodology of present day working structures and ground-breaking moderate PCs, have completed in the main talk affirmation systems that can be sent on devices.
**Related Work**

Already there are different works dependent on helping the visually challenged persons however neither of them has all these determined applications like our task. One of them is a walking stick which has a worked in route framework and further more declares the voice yet it has certain confinements like it can’t indicate indoor route.

There is also a project in which GPS framework and voice declaration framework were presented in shoes. But this project has some limitations like some obstacles in the middle and it do not have an ultrasonic sensor.

One of the most popular project is white stick, the easier obstacle detecting project but it detects the obstacle in the ground for the visually challenged like gaps, uneven surfaces, first floor and so on. Yet, it just recognises the impediments up to head level.

There was additionally guide dog service in which the guide dog will help in the regular day today life. Recently a more number of projects has been proposed for the visually impaired for their easy mobility.

There is additionally a framework called ROSHINI which decides the situation of the client inside the working with the assistance of the sonar innovation that distinguishes the client who is mounted to the ultrasonic modules however it requires the point by point inner mapping of the building.

Another innovation is developed to aware the visually challenged user by any obstacles out there of few meters encompassing which does not utilize any smart phone by simply utilizing the camera module for foundation movement recognition however it doesn’t require any description of the hindrances and it do requires a lot of background processing so it is powerful and it is massive with every one of the parts.

**Implementation of the Hardware Part**

Our task is a blend of few parts like PIC IC controller, Ultrasonic sensor, LIFI transmitter, LIFI collector when all is said is done everyone of these segments were appended in the genera; reason PIC board. The PIC board is controlled by 12V by the connector and that 12V is changed over into 5V by the voltage controller alongside the warmth match up and that 5V is utilized for the entire PIC board. Fig 1 portrays the general square chart of the task. The entire IC is encouraged with the implanted C program accumulated with the MP-LAB compiler as appeared in Fig 2. And it was dumped into the PIC IC by the PIC 2 controller.

A constant electrical frequency is given to the PIC IC by the crystal oscillator which portrays its clock speed. There are two sections in the venture they are LIFI transmitter and recipient. We constructed an indoor portable application in which we need to feed the name of the room and the number in earlier and this data will be consequently spared in the impermanent root envelope of the application. At that point the utilization must express the ideal space to which he needs to go to the versatile application.

We are utilizing four LIFI transmitters one in each room every one of them is dispensed with certain number which it continuously radiates that number. In the event that the client with the collector goes onto the specific room that particular signal which was emitted from the transmitter is received by the receiver. On of the chance that the client strolls into the right room which he told to the versatile application then it will report that it as the right goal if not it will manage the course to the outwardly hindered through voice declaration so it will be much less demanding for the debilitated individual to move in the building.

The PIC16F877A is our PIC controller which has 40 pins. The pins 19-30 were associated with the LCD show and till 33 is associated with the ultrasonic sensor pins 13 and 14 were associated with the crystal oscillator which gives certain frequency to the controller. The compin is associated with the LIFI recipient and these altogether appeared in the Fig 3 as the OTG link is associated with the cell phones.

The mobile applications which were utilized in our project are made by Java, Java Script, SQL. First part of the program was written in the Java and it was appended with the SQL. Then an incorporated type of SDK record application is made and later changed over into the apk form then the impermanent root document is made in the root envelope of the mobile application which stores certain command given by the client.
There is also an outdoor application which permits the visually impaired to say the voice directions like source and destination so this application can demonstrate the root guide of an ideal root and declares the voice directions. In this event when the client comes inside the building, the cell phone will automatically connected to the wifi and the indoor application springs up and it takes the control and the ideal room will be announced by the voice assistance. The cell phone is associated along with the PIC board via OTG cable and the LIFI receiver got the flag which was sent by the LIFI transmitter and the voice command of the ideal goal is declared by the mobile application.

Conclusion

Our proposed work speaks to helping the visually challenged people to realize their day by day encompassing neighbourhood by sustaining the framework the code and influencing it to perceive where the client is by running the code out of sight. At first we made an mobile application that which can take in the goal of the client required by the client and afterward if the client is in the wrong goal and it can declare the right course of the ideal room which he needs to go. We also have certain drawbacks like it can identify the obstacles by the ultrasonic sensor however it don’t know whether the objects is moving or stationary and when comes to the outdoor it also cannot locate precisely and the moving vehicles and it can likewise control the path to the outwardly tested in doing their day by day normal and even later on this framework has a lot of hope in developing.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

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 specialties. 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 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 background
• Material and Methods
• Discussion
• Findings
• Conclusion
• 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

Our Contact Info:

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
CALL FOR SUBSCRIPTIONS

About the Journal

Indian Journal of Public Health Research & Development is a double blind peer reviewed international Journal. The frequency is Monthly. 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 specialties 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