INTERNATIONAL EDITORIAL ADVISORY BOARD

1. Dr. Abdul Rashid Khan (Associate Professor)  
   Department of Public Health Medicine, Penang Medical College, Penang, Malaysia
2. Dr. V Kumar (Consulting Physician)  
   Mount View Hospital, Las Vegas, USA
3. Basheer A. Al-Sum (Associate Professor)  
   Botany and Microbiology Deptt, College of Science, King Saud University, Riyadh, Saudi Arabia
4. Dr. Ch Vijay Kumar (Associate Professor)  
   Public Health and Community Medicine, University of Buraiuni, Oman
5. Dr. VMC Ramaswamy (Senior Lecturer)  
   Department of Pathology, International Medical University, Bukit Jall, Kuala Lumpur
6. Kartavya J. Vyas (Clinical Researcher)  
   Department of Deployment Health Research, Naval Health Research Center, San Diego, CA (USA)
7. Prof. PK Pokharel (Community Medicine)  
   BP Koirala Institute of Health Sciences, Nepal

NATIONAL EDITORIAL ADVISORY BOARD

1. Dr. Anju Ade (Associate Professor)  
   Navodaya Medical College, Raichur, Karnataka
2. Dr. E. Venkata Rao (Associate Professor)  
   Community Medicine, Institute of Medical Sciences & SUM Hospital, Bhubaneswar, Orissa
3. Dr. Amit K. Singh (Associate Professor)  
   Community Medicine, VCSG Govt. Medical College, Srinagar-Garhwal, Uttarakhand
4. Dr. R G Viveki (Professor & Head)  
   Community Medicine, Belgium Institute of Medical Sciences, Belgium, Karnataka
5. Dr. Santosh Kumar Mulage (Assistant Professor)  
   Anatomy, Raichur Institute of Medical Sciences Raichur (RIMS), Karnataka
6. Dr. Gouri Ku. Padhy (Associate Professor)  
   Community and Family Medicine, All India Institute of Medical Sciences, Raipur
7. Dr. Ritu Goyal (Associate Professor)  
   Anaesthesia, Sarwat Institute of Medical Sciences, Panchsheel Nagar
8. Dr. Anand Kalaskar (Associate Professor)  
   Microbiology, Prathima Institute of Medical Sciences, AP
9. Dr. Md. Amirul Hassan (Associate Professor)  
   Community Medicine, Government Medical College, Ambedkar Nagar, UP
10. Dr. N. Girish (Associate Professor)  
    Microbiology, VIMS&RC, Bangalore
11. Dr. BR Hungund (Associate Professor)  
    Pathology, JNMC, Belgaum.
12. Dr. Sartaj Ahmad (Assistant Professor)  
    Medical Sociology, Department of Community Medicine, Swami Vivekananda Subharti University, Meerut, Uttar Pradesh, India
13. Dr Sumeeta Soni (Associate Professor)  
    Microbiology Department, B.J. Medical College, Ahmadabad, Gujarat, India

NATIONAL SCIENTIFIC COMMITTEE

1. Dr. Anju Ade (Associate Professor)  
   Navodaya Medical College, Raichur, Karnataka
2. Dr. E. Venkata Rao (Associate Professor)  
   Department of Community Medicine, Institute of Medical Sciences & SUM Hospital, Bhubaneswar, Orissa
3. Dr. Amit K. Singh (Associate Professor)  
   Department of Community Medicine, VCSG Govt. Medical College, Srinagar-Garhwal, Uttarakhand
4. Dr. R G Viveki (Professor & Head)  
   Community Medicine, Belgium Institute of Medical Sciences, Belgium, Karnataka
5. Dr. Santosh Kumar Mulage (Assistant Professor)  
   Department of Anatomy, Raichur Institute of Medical Sciences Raichur (RIMS), Karnataka
6. Dr. Gouri Ku. Padhy (Associate Professor)  
   Department of Community and Family Medicine, All India Institute of Medical Sciences, Raipur
7. Dr. Ritu Goyal (Associate Professor)  
   Department of Anaesthesia, Sarwat Institute of Medical Sciences, Panchsheel Nagar
8. Dr. Anand Kalaskar (Associate Professor)  
   Department of Microbiology, Prathima Institute of Medical Sciences, AP
9. Dr. Md. Amirul Hassan (Associate Professor)  
   Department of Community Medicine, Government Medical College, Ambedkar Nagar, UP
10. Dr. N. Girish (Associate Professor)  
    Department of Microbiology, VIMS&RC, Bangalore
11. Dr. BR Hungund (Associate Professor)  
    Department of Pathology, JNMC, Belgaum.
12. Dr. Sartaj Ahmad (Assistant Professor)  
    Department of Medical Sociology, Department of Community Medicine, Swami Vivekananda Subharti University, Meerut, Uttar Pradesh, India
13. Dr Sumeeta Soni (Associate Professor)  
    Department of Microbiology, B.J. Medical College, Ahmadabad, Gujarat, India
1. Oral Versus Intravenous Iron for Treatment of Iron Deficiency Anaemia in Pregnancy: A Randomized Controlled Trial ................................................................. 01
   Monika Dalal, Ritu Goyal, Smriti Nanda, Pushpa Dahiya, Krishna Dahiya, Shikha Madan

2. Effectiveness of Educational Intervention on Quality of Life of Patients with Type 2 Diabetes Mellitus ...... 07
   Sindhu L, B JayaKumar

3. A Study to Assess Stigma and Discrimination Associated with Tuberculosis in 18 Year and above Patients Attending CHC Hapur ................................................................. 13
   P N Bhise, Akhilesh Kumar Malhotra, Sandhya Nirmal Bhise

4. Histopathological Review of Dermatological Disorders with a Keynote to Granulomatous Lesions: A Retrospective Study ................................................................. 18
   Ankit Singh, Amit Kumar Nirmal, Prapti Gupta, Jay Kant Jha

5. Leadership Style Correlation with the Occurrence of Unsafe Act Fabrication Employees Pt. BSB Gresik .... 23
   Fardiansyah, Rachmat, Prasetya, T.A.E, Ardyanto, D, Notobroto, H B

6. Relationship between Underweight and Academic Achievement among Middle School Children ................................................................. 28
   Neha Bansal

7. A Cost Analysis of Different Brands of Anticonvulsant Drugs Available in India ................................. 32
   Ananda Lakshmi, B Krishna Prasanth, Sadgunottama Goud Kamparaj

8. Knowledge and Life Style Practices of Individuals with Pre-Hypertension ........................................... 37
   Keerthi S Nair, Bony M Sunny, Sneha M Y

9. A Study of Self-Perceived Need for Management Training among Interns at a Government Medical College in Karnataka ................................................................. 44
   Manjunatha S N, Chandrakumar S G, Revathi Devi ML, Shekar MA, Krishna Murthy, Prashantha B

10. A Correlational Study on Assertiveness and Self Esteem of Undergraduate Students of a Selected College of Nursing, Ernakulam ................................................................. 49
    Sreedevi P A, Aswathy B L, Neethumol Roy

11. Qualitative Study on What Makes a Primary Health Center Gets Utilized, in Belgaum District North Karnataka India ................................................................. 56
    Devika Pandurang Jeeragyal, Sasidhar M, K R John, Archana A M

12. An Awareness Survey on Safe Sexual Practice among First Year Medical Students ................................. 61
    Samir Chattopadhyay, Arvind K Shukla, Salki Matta, Nandini Sethi, Neha Rani
13. Prevention of Catheter Associated Urinary Tract Infection (CAUTI) ................................. 68
   Manu Acha Roy, Nisha Philip, Deepa Fulwadiya, Shruti Dhabade

14. Smoked Tobacco Prevalance, Knowledge of Hazards and Motivation to Quit among Smokers in Suburban Mumbai .......................................................... 74
   Tyagi Rahul, Hande Vivek, Singhal Anuj

15. Menstrual Gymnastics on Beta Endorphins Hormone Levels and Intensity of Pain in Premenstrual Syndrome .............................. 80
   Sri Sumarni, Nur Khafidhoh, Umaroh, Munayaroch, Ismi Rajiani

   Shweta R Naik, G V Khyathi, A C Lokesh

17. Development and Assessment of Feasibility of a Prototype Android Application in Management of Dysphagia .......................... 92
   Shmiruthy Ranjan, Vijay Kumar K V

18. Bacterial Load and Contamination of Indian Currency Note: Isolation and Transferability Studies of Multi-Drug Resistant Bacteria ...................... 97
   Prasanth Manohar, Thamaraiselvan Shanthini, Priyanka Goswami, Munia S, Haimanti M, Ashok J Tamhanka, Nachimuthu Ramesh

19. Prescription Audit of Outpatient Departments of a Tertiary Care Hospital in Maharashtra .......... 103
   Anil Pandit, Jyoti Joshi, Amrita Vaidya

20. Differences in the Influence of the Quality of Life to Marital Satisfaction in Women Early Marriage and Not Early Marriage .............................................. 108
   Nur Laily, Nia Kania, Adenan, Bahrul Ilmi, Lenie Marlinae

21. Diagnostic Accuracy of Procalcitonin as a Marker of Gram-Negative Bacteremia on Sepsis and Septic Shock Patients in Intensive Care Unit (ICU) ........................................ 113
   Syafri K Arif, Abdul Wahab, Syafruddin Gaus, Muh R Ahmad, Christa E Damongilala

22. Factors of Skipping Breakfast and Association between Skipping Breakfast and Academic Achievement of Nursing Students .......................... 118
   Pratiti Haldar, Baby S Nayak, Yashodha Satish

23. A Study to Assess Knowledge, Attitude and Practices Regarding Tuberculosis among 18 Year and above Patients Attending CHC Hapur ........................................ 125
   Akhilesh Kumar Malhotra, P N Bhise, Sandhya Nirmal Bhise

24. Role of Fine Needle Aspiration Cytology in the Diagnosis of Skin and Superficial Soft Tissue Lesions: A Study of 255 Cases .................. 131
   Ankit Singh, Amit Kumar Nirmal, Jay Kant Jha

   Ramkumar A

26. Study of Compliance of Surgical & Medical ICUs to the Process of Preventing Needle Stick Injuries & Blood/Body Fluid Exposures ................................. 140
   A P Pandit, Bhairavee Samant, Vidhi Jain

27. E-Recruitment through Job Portals and Social Media Network: Challenges & Opportunities ...... 143
   Ramkumar A
28. The Study on Thyroid Status among Newborns in Gautam Budha Nagar District in India ...................... 149
   Chandra Prakash Sharma, Widhi Dubey, Suryakant Nagtilak

29. The Prevalence of Restless Leg Syndrome in Iraqi Multiple Sclerosis Patients ............................... 155
   Sajid I Al-Hussainy, Aqeel K Hatem

30. Factors affecting the Performance of Members Team Preparation Accreditation of Public Health Center
   (Study at Public Health Center in Kotawaringin Timur District) .............................................................. 161
   Nurul Fatimah Apriliani, Edi Har toyo, Lenie Marlinha, Husaini, Bahrul Ilmi

   Sheela S, Venkataraja U Aithal, Rajashekh B, Balakrishnan R

32. Clinical and Radiographic Comparison of Conventional and Minimal Invasive Method of Cavity Preparation
   in Mandibular Molars ................................................................................................................................. 170
   Sonali Sharma, Mithra N Hegde, Vandana Sadananda

33. Diabetes Mellitus Type 2 - A Predictor of Metabolic Syndrome in Urban Population of North India ........ 176
   Manoj Kumar Sharma, Sonali Pandey, Suryakant Nagtilak

34. The Impacts of Goods and Services Tax (GST) on Middle Income Earners in India ........................... 182
   Ch. Bala Nageswara Rao, B Neeraja

35. The Impact of Scenario Planning on Organizational Sustainability in Healthcare Private Sector .......... 188
   Hamad Karem Hadrawi

36. Detection of Bacterial Causes of Psoriasis and Determination of Some Immunological Aspects in Patients
   .................................................................................................................................................................. 194
   Zainab Nasser Nabat

37. Assessment of Knowledge, Attitude and Practices about Rabies in Urban Slums of Amritsar City (Punjab),
   India ......................................................................................................................................................... 199
   Kanwal Preet Kaur Gill, Priyanka Devgun

38. Faeces Waste Treatment Design in Household with Narrow Land Area ............................................. 205
   Marlik, Demes Nurmayanti, Ferry Kriswandana, Heru Santoso Wahito Nugroho

39. Risk Factors at Home on Acute Respiratory Infection (ARI) Incidence in Children Under Five in Sapuli
   Island, South Sulawesi ............................................................................................................................. 210
   Mulyadi, Heru Santoso Wahito Nugroho

40. Relation between Underutilization of Antenatal Care and Birth Outcome ......................................... 215
   Bushra M Majeed, Ruqiya S Tawfeek, Nabila K Yaaqoub

41. Bacteriological Profile of Wound Infections in MRSA and ESBL Detection in E.Coli & Klebsiella .......... 220
   Suresh P, P Vamsimuni Krishna, V Praveen Kumar, Sreenivasulu Reddy

42. The Risk Factors of Hepatitis B in Pregnant Woman in Banjarmasin on August – October Period 2017 ... 224
   Melani, Zairin Noor Helmi, Husaint, Roselina Panghiyangani, Eko Suhartono

43. Investment Decision Factors Influencing the Share Market Investors in Chennai City ........................ 229
   V Venkatragavan, M Chandran

44. An Assessment of Rural Health Care Facilities and Infrastructural Gaps in Alipurduar District,
   West Bengal, India .................................................................................................................................. 233
   Barnali Biswas, Piyal Basu Roy
45. Work Place Violence Against Nursing Staff Working in Emergency Departments at General Hospitals in Basra City ................................................................. 239
   Samira Muhammed Ebrahim, Sajjad Salim Issa

46. Implementation E-Health System on Use Behavior Customer based on Unified Theory of Acceptance and Use of Technology (Utaut) ................................................................. 245
   Farouk Ilmid Davik, Nurus Sa'idah, Muhammad Ardian C.L, Djazuly Chalidyanto

47. Nurses Practice Concerning Postoperative Clean Wound Dressing .................................. 251
   Abdulkareem Salman Khudhair

48. The Role of Moringa Oleifera Leaves Against Oxidative Stress and Chronic Inflammation: A Review ..... 257
   Kusmiyati, Soedjajadi Keman, Muhammad Amin Suwarno, Heru Santoso Wahito Nugroho

49. Exploration on Adolescent Knowledge Related Metabolic Syndrome (METS) ..................... 263
   Nurhaedar Jafar, Rahayu Indriasari, Aminuddin Syam, Yessy Kurniati

50. Qualitative Study; Knowledge, Arv Access, and Adherence among People Living with HIV in Bulukumba District, South Sulawesi ................................................................. 267
   Suswani A, Arsunan AA, Amiruddin R, Syafar M, Yurniati

51. Parental Involvement, Academic Performance and Mental Wellbeing of Selected Pre- University Students of Udupi District ................................................................. 273
   Rochelle Jane Dsa, Blessy Prabha Valsaraj, Renjulal Yesodharan
CONTENTS

52. Triple Band Monopole Frequency Reconfigurable Antenna for Wireless Medical Applications .......... 279
   G Jyothsna Devi, U Ramya, B T P Madhav

53. Fractal Shaped Concentric Ring Structured Reconfigurable Monopole antenna with DGS for GPS, GSM,
    WLAN and ISM Band Medical Applications ................................................................. 285
   M Monika, Sk Rajiya, B T P Madhav

54. Triple Band Defected Ground Structure F-Shaped Monopole Antenna for Medical Band Applications ...... 290
    Raghava Yathiraju, P Pardhasaradhi, B T P Madhav

55. Circular Slotted Reconfigurable Antenna for Wireless Medical Band and X-Band Satellite Communication
    Applications ........................................................................................................ 296
    SK Rajiya, M Monika, B T P Madhav

56. Tristrip Monopole Antenna with Split Ring Resonators for ISM Band Biomedical Applications .......... 301
    M Sujatha, B T P Madhav, V Prakhya, B Akhila, N Gowtham, S Mozammil, M Venkateswara Rao

57. A CPW fed Dual Band Notched UWB Antenna for Wireless Medical Applications ............................ 306
    K Phani Srinivas, Habibulla Khan, B T P Madhav

58. Frequency Switchable Monopole Antenna for Multi Band Wireless Medical Applications .................... 311
    U Ramya, G Jyothsna Devi, B T P Madhav

    SK Hasane Ahammad, V Rajesh

60. Trapezoidal Notch Band Frequency and Polarization Reconfigurable antenna for Medical and Wireless
    Communication Applications ......................................................................................... 324
    B Siva Prasad, P Mallikarjuna Rao, B T P Madhav

61. Sierpinski Meta Fractal Monopole Antenna with Defected Ground Structure for Medical and Satellite
    Communication Applications ......................................................................................... 329
    S Ram Kumar, M V S Prasad
62. Determinants of Malnutrition in Children Under Five Years in Developing Countries: A Systematic Review
   Tasnim Tasnim

63. The Effect of Blood Lead Levels on Malondialdehyde as an Indicator of Oxidative Stress in Workers of Gas Station in Sleman
   Noviati, Brian Klopfleisch

64. Analysis Chemical Compound of Pokea (Batissa Violacea Celebensis Martens 1897) The Origin of Konawe Regency Southeast Sulawesi
   Sri Anggarini Rasyid, Maria Bintang, Bambang P Prio Soeryanto, Ratna Umi Nurlila, Ridwan Adi Surya

65. Geographically Weighted Regression (GWR) Approach in the Modeling of Malnutrition and the Influencing Factors in Muna Regency
   Fitri Rachmillah Fadmi, Sri Mulyani, La Djabo Buton

66. The Effect of Technical and Functional of Health Service Quality Toward the Image of Faisal Islamic Hospital
   Alwy Arifin, Nisrina Nursakinah, Darmawansyah, Saifuddin Sirajuddin, Dian Saputra Marzuki

67. Model Development of Clinical Learning with Outcome Present Test Method Peer Learning and Application in Medical Surgical Nursing Stage for the Student of Nurse in Stikes Mandala Waluya
   Asbath Said, Islaeli, Sartini Risky, Ari Novitasari, Dwi Wulandari, Dewi Sari Pratiwi

68. Spatial and Temporal Epidemiological Study of Smear Positive Tuberculosis in Kendari, Southeast Sulawesi, Indonesia
   Titi Saparina, Rachmawati, Lodges Hadju, Muhammad Guntur Nangi, Muhammad Isrul

69. Analysis of Quality of Life among Patients with Diabetes Mellitus in Elderly People in Wua Wua Health Centre
   Rahmawati, Titi Saparina L, Ridia Utami Kasih, La Djabo Buton, Sri Mulyani

70. Legal Protection for Independent Midwife for Using Ultrasonography in Wonosobo Regency
   Toto Surianto S, Dwi Erna Widayanti

71. The Relation between Knowledge, Stress and Salt Consumption with Incidence of Hypertension in Elderly Woman Out Patients in General Hospital of Bahteramas Southeast Sulwesi Province
   La Djabo Buton, Fitri Rachmillah Fadmi, Rahmawati, Sri Mulyani, Noviati
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>Differences Knowledge Prevention and Treatment of Diarrhea with Role Play Methods in School Age Children</td>
<td>Islaeli, Ari Nofitasari, Asbath Said, Dewi Sari Pratiwi, Ruslan</td>
<td>390</td>
</tr>
<tr>
<td>73</td>
<td>Influence of Back Massage Method to Intensity of Inpartus Active Phase Pain in the Delivery Room of Kendari City Hospital</td>
<td>Dewi Sari Pratiwi, Ari novitasari, Islaeli, Asbath said, Yulli Fety, Sri Mulyani</td>
<td>394</td>
</tr>
<tr>
<td>74</td>
<td>Knowledge and Attitude of Primary School Teacher on the Practice of Selected Food Students Containing Additional Hazardous Foodstuffs in Sdn 01 Poasia Kota Kendari</td>
<td>Ari Nofitasari, and Islaeli, Dewi Sari Pratiwi, Asbath Said, Sartini Risky, Sari Arie Lestari</td>
<td>399</td>
</tr>
<tr>
<td>75</td>
<td>Hold Relax Technique and Oral Glucosamine are Effective on Decreasing Pain, Joint Stiffness, Functional Limitation and Serum Level of Comp in People with Osteoarthritis</td>
<td>Djohan Aras, Mochammad Hatta, Andi Asadul Islam, Syafri Kamsul Arif</td>
<td>403</td>
</tr>
<tr>
<td>76</td>
<td>Analysis of 24-Hour Postpone Time of Newborn Umbilical Cord Clamp to Baby Weight Elevation Newborn in Kendari, Southeast Sulawesi, Indonesia</td>
<td>Rosmiati Pakkan, Sartini Risky, Adriyani</td>
<td>408</td>
</tr>
<tr>
<td>77</td>
<td>Risk Factor of Rheumatoid Arthritis among Elderly in UPT Panti Werdha Mojopahit Mojokerto District Indonesia</td>
<td>Abdul Muhith, M.H. Saputra, Arief Fardiansyah, Lady Andani</td>
<td>412</td>
</tr>
<tr>
<td>78</td>
<td>Protease Potency Assay of Indigenous Proteolytic Bacteria in the Collagen Isolation Process from Snakehead Fish Scale (Channa striata)</td>
<td>Sugireng, Widodo, Suharjono</td>
<td>417</td>
</tr>
<tr>
<td>79</td>
<td>Related Factors Increased Obesity Prevalence in Adult Women in Denpasar City, Bali</td>
<td>Ni Komang Wiardani, I Putu Gede Adiatmika, Dyah Pradnya Paramita D, Ketut Tirtayasa</td>
<td>422</td>
</tr>
<tr>
<td>80</td>
<td>The Determinants of the Geographical Distribution and Transmission of 16S rRNA of M.leprae in Endemic Areas, Indonesia</td>
<td>Andi Rizki Amelia, Ridwan Amiruddin, Andi Arsunan Arsin, Burhanuddin Bahar, Mochammad Hatta</td>
<td>429</td>
</tr>
<tr>
<td>81</td>
<td>Behavioral Mercury Exposure of People in Artisanal and Small-Scale Gold Mining Site Area at Lebaksitu Village, 2017</td>
<td>Astri Getriana, Umar Fahmi Achmadi, Citra Hati Leometa</td>
<td>433</td>
</tr>
<tr>
<td>82</td>
<td>Effectiveness of Household Insecticides to Reduce Aedes Aegypti Mosquitoes Infestation : A Community Survey in Yogyakarta, Indonesia</td>
<td>Dyah Widiastuti, Tri Isnani, Sunaryo, Siwi Pramatama Mars Wijayanti</td>
<td>439</td>
</tr>
<tr>
<td>83</td>
<td>The Threat of Lymphatic filariasis Elimination Failure in Pasaman Barat District, West Sumatra Province</td>
<td>Bina Ikawati, Tri Wijayanti, Jastal</td>
<td>446</td>
</tr>
<tr>
<td>84</td>
<td>Spatio-Temporal Factors Related to Dengue Hemorrhagic Fever in Makassar City, 2010 – 2014</td>
<td>Hasanuddin Ishak, Anwar Mallongi, Isra Wahid, Imam Bachtiar</td>
<td>452</td>
</tr>
</tbody>
</table>
85. The Use of Owner House ID Card to Increase Effectiveness of Monitoring Larva Visit by Jumantik ........... 457
   Mochammad Choirul Hadi, Ni Made Marwati, I Gusti Ayu Made Aryasih, Dewa Ayu Agustini Posmaningsih,
   I Nyoman Sujaya, Anwar Mallongi

86. Administration of Tempehethanol Extract on Prenatal Until Weaning Period Inhibit the Ovary Follicles
   Developing of Little Wistar Rats .............................................................................................................. 462
   Ni Nyoman Budiani, Ni Ketut Somoyani, Gusti Ayu Marhaeni, Gusti Kompiang Sriasih, Luh Puti Sri Erawati,
   Anwar Mallongi

87. Combination of Vimentin, E-Cadherin, CD44 and CD24 Expression as Predictor Model of Anthracycline
   Base Neoadjuvant Chemotherapy Response to Stage IIIB Luminal Breast Cancer ................................. 468
   Bachtiar M Budianto, Bambang Pardjianto, Edy Mustofa, Setyawati Soeharto, Solimun

88. Comparison of Tumor Growth in Mice Balb/C Induced Breast Cancer Cells Injected with Corticosteroids and
   Black Seed Oil Extract .......................................................................................................................... 474
   Andi Asadul Islam, Itzar Chaidir Islam, Muhammad Faruk, Prihantono Prihantono

89. Hemorrhoidectomy using Hemorrhoidal Artery Ligation and Rectoanal Repair (HAL-RAR) Technique to
   Reduce Level of Pain Perceived by Patients Postoperative ................................................................. 480
   Warsinggih, Prihantono

90. Characteristics of Multi-drug Resistant Tuberculosis (MDR-TB) Patients in Medan City in 2015-2016 ...... 484
   Syarifah, Erna Mutiara, Sri Novita
91. An Investigation in Learning English Language by Students of Sudanese University A Case Study of Tertiary Level Khartoum Locality ................................................................................................................................. 490
   Sangita Babu, Mahassin Osman Mohmmed Gibreel

92. Design of Mixed Radix-2, 3& 4 based SDF-MDC FFT for OFDM Application .......................................... 501
   K Periyarselvam, G Saravanakumar, M Anand

93. Second Order Sliding Mode Control of Three Phase Four Switch VSI Fed Fault Reconfigurable Sensor Less PMSM Drive .................................................................................................................................................... 507
   Ashok Kumar R, Balaji K

94. An Investigation of English Spelling Achievement among Second Level Saudi Students at King Khalid University ......................................................................................................................................................... 517
   Mahassin Osman Mohmmed Gibreel, Sangita Babu

95. PFB+ Tree For Big Data Memory Management System ................................................................................ 531
   K Santhi, T Chellatamilan T, B Valarmathi

96. A Bipolar-Pulse Voltage Method For Junction Temperature Measurement of Sporadic Current LED .......... 539
   K Thanigai Arul

97. Skin Cancer - Computer Aided Diagnosis by Feature Analysis and Machine Learning: A Survey ............ 544
   S P Maniraj, P Sardar Maran

98. Utilization of Information Technology in Teaching English Literature Christalin Janet ............................... 550
   Christalin Janet

99. Knowledge Management Utilized to Developing College English Teaching Group ..................................... 554
   K Manigandan

100. Study of Eddy Current in Litz Wire Using Integral Equation ........................................................................ 557
    Paulraj Jayasimman

101. Differential Quadrature Method Useing Obtained Poisson Equations ........................................................ 560
    G Genitha

102. Far-Field Distribution of High Power Laser Beam ........................................................................................ 563
    M Suresh Kumar
103. Dynamic Model For Gathering Target Estimation Using Graph Theory ....................................................... 566
   C Periyasamy

104. Sequential Quadratic Programming Optimization Method Used Cutting-Stock Problem ............................. 570
   M Sudha

105. Algorithm for the Solution of ODE and PDE using Genetic Programming And Automatic Differentiation ................................................................................................................................................ 574
   S Meher Taj

106. Analyze the Probability Function Using Random Distribution Control Method in Nonlinear System ........... 579
   I Paul Raj Jayasimman

107. Fatigue Analysis of Stiffened Plates Based on Accumulative Plastic Strain Model ........................................ 582
   M Sudha

108. Transmission Line Applications Using with 2-D Numerical Inverse Laplace Transforms ............................ 586
   C Periyasamy

109. GPS Signal Anti-Jamming Assisted with Probability Statistics based on Frequency-Space Domain .......... 590
   P Palanichamy

110. Micromachined Flow Impactor for Spectrometer ........................................................................................ 595
    K Thanigai Arul

111. Photovoltaic Module’s Physics: An Eight-Parameter Adaptive Model for the Single Diode Equivalent Circuit ........................................................................................................................................... 600
    Suresh Kumar

112. Piezoelectric Microgenerator based Fabrication of Polymer Substrate with PPE, IDE and ME ............... 605
    K Rajesh
Oral Versus Intravenous Iron for Treatment of Iron Deficiency Anaemia in Pregnancy: A Randomized Controlled Trial

Monika Dalal¹, Ritu Goyal², Smiti Nanda³, Pushpa Dahiya³, Krishna Dahiya⁴, Shikha Madan⁵
¹Assistant Professor, ²Senior Specialist, ³Senior Professor, ⁴Professor, ⁵Assistant Professor, Department of Obstetrics and Gynaecology, Pt. B.D. Sharma Post Graduate Institute of Medical Sciences, Rohtak, Haryana and Deen Dayal Upadhyay Hospital, New Delhi

ABSTRACT

Introduction: Oral iron supplementation is standard of care in obstetrical practice in pregnancy. But oral iron is frequently restricted by limited absorption, low tolerability, non-compliance and side effects. Intravenous iron could be a good alternative with sure compliance.

Aim: To evaluate the efficacy and adverse effects of intravenous iron sucrose and compare it with oral ferrous sulphate therapy in the treatment of iron deficiency anaemia of pregnancy.

Method and Material: A randomised, open labelled, controlled trial was performed in a tertiary care hospital. 150 Women at 26 to 34 weeks of gestation with haemoglobin between 7-11 g/dl who met the inclusion criteria were randomised into oral iron group I and intravenous iron sucrose group II. Patients were followed till delivery. Haemoglobin levels, reticulocyte count, serum ferritin levels were analysed to compare efficacy and safety.

Results: Rise in haemoglobin level was more in group II as compared to group I in total and in terms of period of gestation and gravidity. The rise in reticulocyte count was higher in group I at the end of 1 week. The rise in ferritin was very highly significant in subjects of both groups recruited at any period of gestation at 4 weeks after therapy (p<0.001).

Conclusion: Intravenous Iron sucrose is a safe and an effective alternative to oral iron. Iron sucrose restores iron stores faster and more effectively than oral iron in terms of rise in haemoglobin, reticulocyte count, serum ferritin levels and without any serious side effects.

Keywords: Oral iron; Intravenous iron sucrose; iron deficiency anaemia; Pregnancy

INTRODUCTION

Programmes of anaemia prophylaxis based on oral iron supplementation remain a failure despite of oral iron supplementation as a standard obstetrical practice. Whether or not there is need for parenteral iron may be debated. Intravenous iron could be a good alternative in pregnant women to ensure compliance. Many workers have shown that parenteral iron therapy supplies enough iron for erythropoiesis¹ ².

Therefore, the present study was done to compare efficacy and safety of intravenous iron with oral iron in the management of iron deficiency anaemia in pregnancy. Our,being a low resource and anemia prevalent country, importance lies more here.

METHOD

The study was conducted over a period of 1 year in department of obstetrics and gynaecology from
December 2009 to November 2010 in tertiary care hospital. Women at 26 to 34 weeks of gestation with haemoglobin between 7-11 g/dl were included in the study. The study was cleared by the institutional ethical committee. Mothers with anaemia not linked to iron deficiency, Intolerance to iron derivatives, systemic and chronic diseases, multiple pregnancy, antepartum haemorrhage, premature rupture of membranes and hypertensive disorders of pregnancy and those who refused consent were excluded.

Two hundred eighty pregnant mothers who presented to antenatal clinic of the department were screened for enrollment. Hundred thirty of them were excluded: One hundred twenty five did not meet inclusion criteria, 5 declined to give consent. The remaining 150 mothers were randomised by random number table to the two groups of 75 each (oral iron, intravenous group).

The randomisation was done by keeping equal number (75 each) of sealed, opaque, unmarked and identical envelopes containing slips bearing the iron therapy to be administered in a box in antenatal clinic. Randomization to one of the two groups was done by picking up an envelope after thorough shuffling and the indicated iron therapy was given. An informed consent was taken from all patients. Before starting therapy, all women were dewormed with albendazole (400 mg stat). The baseline investigations (haemoglobin, reticulocyte counts, serum ferritin level) were carried out in all patients.

Women in group I were given oral ferrous sulphate (100 mg elemental iron) that was supplied by the Government of India during pregnancy in b.d doses for Hb between 9-11 g/dl and in t.i.d doses for Hb between 7-9 g/dl. Patients were instructed to take the tablets two hours after meals. The total iron sucrose dosage to be administered were calculated from the following formula:

\[ \text{Iron dosage (mg) = Weight (kg) x (12 - actual Hb) x 0.24 + 500} \]

In each infusion, 200 mg iron sucrose in 100 ml of 0.9% NaCl was infused over 20-30 minutes. Repeated doses were given on consecutive days until the administration of calculated doses was completed before delivery. Additional oral iron was not administered during the study. The following investigations were carried out in these patients:

2. Urine complete examination.
3. Urine culture sensitivity.
4. Stool for ova or cyst on days 1, 2, 3.
5. Hb at 0 day, 2 weeks, 4 weeks and at delivery.
6. Reticulocyte count at 0 day and 1 week.
7. Serum ferritin at 0 day and 4 weeks.

Patients were followed till delivery. Efficacy of oral and intravenous iron supplementation along with side effects, maternal and fetal outcome assessed. Student ‘t’ test, Z test and regression analysis were used for statistical analysis.

**RESULTS**

Two groups were comparable with regard to mean age, parity, BMI and period of gestation (POG). The mean period of gestation when iron therapy was initiated was 29.96±2.33 weeks in group I and 30.77±2.33 weeks in group II.

The difference of rise in haemoglobin between the two groups was not significant at 2 weeks and 4 weeks. But, the mean haemoglobin at delivery was significantly higher in group II in comparison to group I (p<0.001) (Table 1,2).

**TABLE 1: BASELINE HAEMOGLOBIN, RETICULOCYTE AND FERRITIN**

<table>
<thead>
<tr>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>Haemoglobin</td>
</tr>
<tr>
<td>(g/dl⁻¹)</td>
<td>(g/dl⁻¹)</td>
</tr>
<tr>
<td>Reticulocyte</td>
<td>Reticulocyte</td>
</tr>
<tr>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>Ferritin</td>
<td>Ferritin</td>
</tr>
<tr>
<td>(mg/ml)</td>
<td>(mg/ml)</td>
</tr>
<tr>
<td>Mean±SD</td>
<td>Mean±SD</td>
</tr>
<tr>
<td>8.42±0.86</td>
<td>8.40±0.90</td>
</tr>
<tr>
<td>0.81±0.31</td>
<td>0.75±0.35</td>
</tr>
<tr>
<td>32.80±12.37</td>
<td>27.67±13.53</td>
</tr>
<tr>
<td>Range</td>
<td>Range</td>
</tr>
<tr>
<td>7-10</td>
<td>7-10.2</td>
</tr>
<tr>
<td>0.1-0.7</td>
<td>0.2-1.9</td>
</tr>
<tr>
<td>4-62</td>
<td>4-59</td>
</tr>
</tbody>
</table>

p value >.05
TABLE 2: HAEMOGLOBIN LEVEL AFTER ORAL AND INTRA VENOUS THERAPY (gdl⁻¹)

<table>
<thead>
<tr>
<th></th>
<th>0 day</th>
<th>2 week</th>
<th>4 week</th>
<th>Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I (Mean ± SD)</td>
<td>8.42±0.86</td>
<td>8.98±0.86**</td>
<td>9.70±0.96***</td>
<td>9.05±0.90**</td>
</tr>
<tr>
<td>Group II (Mean ± SD)</td>
<td>8.40±0.90</td>
<td>9.05±0.86**</td>
<td>9.74±0.90**</td>
<td>10.16±0.73***</td>
</tr>
</tbody>
</table>

** p<0.01 Highly significant as compared to 0 day
*** p<0.001 Very highly significant as compared to 0 day

When rise in haemoglobin was compared between subjects according to period of gestation in group I, there was a significant rise in haemoglobin at all intervals (26-28, 29-31, 32-34 weeks) after 2 weeks, 4 weeks of therapy and at delivery. Similar trend was observed in rise of hemoglobin in group II at all intervals.

The rise in haemoglobin was compared between the two groups at 2 weeks and 4 weeks. It was not found to be significant in all the three subgroups (p>0.05), but there was a very highly significant difference in haemoglobin at delivery with higher values in group II (p<0.001). This trend was seen in all the three subgroups. There was no difference in percentage rise in haemoglobin at any interval between the two groups. The period of gestation did not affect the rise of haemoglobin after therapy in both the groups.

The rise in haemoglobin was compared between subjects of different gravidity within the group I and II. There was a significant rise in haemoglobin at all intervals. The gravidity did not affect the rise in hemoglobin after therapy in both the groups.

Rise in haemoglobin levels was more in group II as compared to group I in total and in terms of period of gestation and gravidity.

The rise in reticulocyte count was higher in group I at the end of 1 week but the difference was not statistically significant (p>0.05). (Table.3)

TABLE 3: RETICULOCYTE COUNT AFTER THERAPY (%)

<table>
<thead>
<tr>
<th></th>
<th>Group I (Oral)</th>
<th>Group II (Intravenous)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 day</td>
<td>1 week</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>0.81±0.31</td>
<td>1.28±0.37***</td>
</tr>
<tr>
<td>Range</td>
<td>0.1-1.7</td>
<td>0.5-2.9</td>
</tr>
</tbody>
</table>

*** p<0.001 Very highly significant as compared to 0 day
+  p>0.05 Not significant at end of 1 week when compared to group I

The rise in ferritin was very highly significant in subjects of both groups recruited at any period of gestation at 4 weeks after therapy (p<0.001). Ferritin levels increased two fold in group I subjects in all subgroups at 4 weeks. In group II, ferritin levels increased three fold at 4 weeks in all subgroups. (Table.4)

TABLE 4: FERRITIN (ngml⁻¹) LEVEL AFTER THERAPY

<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 day</td>
<td>4 week</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>32.80±12.37</td>
<td>66.09±18.18***</td>
</tr>
<tr>
<td>Range</td>
<td>4-62</td>
<td>28-102</td>
</tr>
</tbody>
</table>

*** p<0.001 Very highly significant when compared to 0 day
+++ p<0.001 Very highly significant when compared at 4 weeks to group I
The ferritin was compared in the two groups among subjects the rise was very highly significant (p<0.001) at 4 weeks in subjects recruited between 26-28, 29-31 weeks and 32-34 weeks of gestation.

The rise in ferritin at 4 weeks was compared in subjects of various gravidity in the two groups. There was a very highly significant rise in ferritin irrespective of the gravidity in both the groups.

Rise in ferritin at 4 weeks was compared among subjects of different gravidity in the two groups. There was a highly significant rise at 4 week in graviga 1, 3 and very highly significant rise in gravidia 2 and 4, with a much higher rise in group II. The difference of rise in ferritin was significant (p<0.01) in gravidia >4 at 4 weeks when compared between the two groups. Ferritin levels had risen three times after therapy in all subgroups in group II. Near doubling was seen in group I in all subgroups at 4 weeks.

Out of the 75 subjects in group I (oral iron therapy) 11 developed side effects in the form of dyspepsia (5); emesis (2); diarrhoea (2); constipation (1) and metallic taste (1).

Nine subjects in group II (intravenous iron therapy) developed side effects in form of pruritis (5); headache (3) and fever (1). None of the subjects developed side effects serious enough to be requiring cessation of intravenous mode of iron therapy.

**DISCUSSION**

Anaemia is a common medical disorder that contributes significantly to maternal morbidity and mortality. Parenteral administration is strongly recommended for all pregnant women in developing countries. This requirement cannot be met by oral route in the majority of patients because of limited absorption, bioavailability and compliance.

In group I, after starting oral therapy, haemoglobin levels at 2 weeks, 4 weeks and delivery were increased (Table 2). In group II, after starting IV iron sucrose haemoglobin levels at 2 weeks, 4 weeks and delivery were significantly increased (Table 3). These findings are similar to those reported in literature who observed that parenterally administered iron sucrose elevated haemoglobin and restores iron stores better than oral iron therapy. Rise in haemoglobin levels was faster and more in group II as compared to group I in total and in terms of period of gestation [Table 2].

In the present study, it was also observed that IV iron sucrose administration led to a significantly higher haemoglobin level at delivery as compared to oral iron therapy [p<0.001, Table 2]. Similar findings also reported by others in literature. Intravenous iron treated iron deficiency anaemia of pregnancy have been reported to induce a similar or slightly more, rapid erythropoietic response than oral iron replacement.

Iron sucrose complex has intermediate stability and strength and is quickly cleared from serum (half life 5-6 hours). Hence, it is more rapidly available for erythropoiesis. The reticulocyte count being an important indicator of erythropoiesis, was also analysed on day 0 and after 1 week in both the groups. Both the groups showed rise in reticulocyte counts, after iron therapy but the rise was higher in group I. Bayoumen et al have also reported that reticulocyte counts increased after iron therapy and difference was not statistically significant until day 21 in favor of IV group.

In the present study, the serum ferritin levels were significantly higher after oral iron therapy in group I at 4 weeks (32.80±12.37 vs. 66.09±18.18 ng/ml). The rise in serum ferritin was highly significant in subjects in both groups recruited at any period of gestation at 4 weeks after therapy (p<0.001). Serum ferritin levels increased two fold in group I subjects and in group II, serum ferritin levels showed three fold increase. Our findings are in agreement with those reported in literature.

Parenteral administration of iron, as an alternative for oral therapy, provides a quick and certain correction of the total iron deficit. Intravenous iron sucrose has been reported to increase haemoglobin and ferritin levels in postpartum iron deficiency anaemia with fewer adverse effects than oral iron therapy in women with postpartum iron deficiency.

In the present study, a significant positive correlation was observed between haemoglobin and serum ferritin levels at 4 weeks in group I (r=0.318, p<0.01). A positive correlation was also observed between birth weight and serum ferritin levels at 4 weeks in group I, though difference was not statistically significant (r=0.05, p>0.05)

Anaemia resolved rapidly with satisfactory increments in Hb levels with intravenous therapy. After
cessation of iron, Hb levels continued to rise in the present study which are similar to other reports.\textsuperscript{14} This might be due to peculiarities in iron absorption kinetics and iron metabolism.

Irrespective of maternal iron stores, fetus tends to obtain iron from maternal transferrin, which is trapped in the placenta and which is turn removes and actively transports iron to the fetus. Gradually, however, such fetuses tend to have decreased iron stores due to depletion of maternal stores. Adverse perinatal outcome are in the form of preterm and small for gestation age babies and increased perinatal mortality rates. Iron supplementation to these mothers improves perinatal outcome.\textsuperscript{16,17}

In the present study, no subject interrupted the oral therapy due to side effects. Also none of the subjects developed side effects serious enough to be requiring cessation of IV mode of iron therapy. Iron sucrose is generally well tolerated with no side effects and anaphylaxis has not been reported as yet.

**CONCLUSION**

Iron sucrose is a safe and effective alternative to oral iron. Iron sucrose treated patients restored iron stores faster and more effectively than oral iron (as evident from rise in Hb, reticulocyte count, ferritin levels and outcome of pregnancy) without any serious adverse reactions. Thus, iron sucrose appears to be safe, and convenient in pregnant iron deficient pregnant women who are unable to obtain an adequate amount of iron rapidly by the oral route and where compliance is poor.

**Conflict of Interest Statement:** we declare that we have no conflict of interest.

**Funding** - None

**REFERENCE**


Effectiveness of Educational Intervention on Quality of Life of Patients with Type 2 Diabetes Mellitus

Sindhu L1, B JayaKumar2
1Assistant Professor, Govt. College of Nursing, 2Former Professor and Head, Dept. of Medicine, Medical College, Thiruvananthapuram.

ABSTRACT

Introduction: Diabetes is a chronic metabolic disease with severe complications and high mortality rate. Living with a chronic illness can negatively affect an individual’s perception of quality of life. The objective of the present study was to determine the effect of educational intervention on quality of life of patients with type 2 diabetes mellitus.

Method: The present study was a quasi-experimental pretest posttest design with experimental group and control group. The study was conducted in the diabetic clinic of Govt. Medical College, Thiruvananthapuram. The participants of the study were selected consecutively. The sample consisted of 140 patients with type 2 diabetes mellitus after 6 months of diagnosis and between the age group of 25 – 65 years, 70 in the experimental group and 70 in the control group. Socio demographic and clinical data were collected using an interview schedule. The health related quality of life was measured using Short form 36 Version 2 (SF 36 V2) quality of life survey. Educational intervention was given to the patients in the experimental group and patients in the control group received only the standard treatment. Data were collected at baseline, after 3 months and 6 months from both the groups. The data were analyzed using appropriate descriptive and inferential statistics.

Results: The quality of life assessment revealed that there was an increase in all the individual domains and the overall quality of life scores of the patients in the experimental group when compared to the patients in the control group, which was statistically significant (p< 0.0001). Thus educational intervention was effective in improving the quality of life of patients with type 2 diabetes mellitus.

Conclusion: As a chronic disease, diabetes affect the end organs and complications have tremendous impact on quality of life of the individual and they require long term care and management. Diabetes self-management education plays a significant role in the clinical management of diabetes. The study provides evidence that diabetes self-management education can effectively implemented in our settings and improve health indicators significantly.

Keywords: educational intervention, type 2 diabetes mellitus, quality of life

INTRODUCTION

Diabetes mellitus is a complex disease that is associated with various complications, leading to premature death and disability. The dramatic rise in the incidence and prevalence of diabetes is a great challenge for all nations. The number of people with diabetes is increasing due to population growth, urbanization and increased prevalence of obesity. Apart from its complications, diabetes can affect the quality of life of people with diabetes. Since diabetes is a chronic illness it requires continuous medical care and patient self-management education. Diabetes self-management education is an important aspect of care in order to improve patient outcome and quality of life.

Quality of life is a critical aspect in diabetes as poor quality of life leads to diminished self-care that in turn leads to worsened glycemic control, and increased risk of complications. A study on factors affecting the quality...
of life of chronically ill patients revealed that quality of life of patients with diabetes was significantly lower and presence of complication was the most important variant that influence the quality of life.\(^5\) Patients’ lack of knowledge about disease care can impede their ability to manage their disease.\(^6\) Education is important as diabetes education result in more chance of complications and less chances of leading a healthy life.\(^1\)

A randomized controlled trial assessing the quality of life in patients with type 2 diabetes found that education of patients with type 2 diabetes can facilitate the patients’ attainment of specific knowledge and conscious behaviors that leads to better quality of life.\(^7\)

Nurses have an important role in improving the quality of life of a patient with diabetes mellitus by teaching self-management training, which help people with diabetes to adjust their daily regimen to improve metabolic control.\(^8\) By properly managing blood glucose, patients are capable of performing everyday activities with fewer physical restrictions that impact quality of life.

Another RCT that explored the effect of patient counseling on quality of life in type 2 diabetes mellitus showed an improvement in mean quality of life score in the intervention group.\(^9\)

The aim of the present study was to assess the effectiveness of educational intervention on quality of life of patients with type 2 diabetes mellitus.

MATERIALS AND METHOD

Research Approach – Quantitative research approach

Research design – Quasi experimental pretest posttest design with experimental and control group


Sample & sampling technique – 140 patients with type 2 diabetes mellitus after 6 months of diagnosis, 70 in the control group and 70 in the experimental group. The samples were recruited consecutively.

Data collection process

Socio demographic and clinical data were collected using an interview schedule. The quality of life patients was measured using a standardized questionnaire of SF 36 V2. SF 36 V2 is a multipurpose, 36 item health survey yielding a profile of two health component summary measures and eight health domain scales. Health component summary are physical Component Summary (PCS) and Mental Component Summary (MCS). PCS gives the summary of Physical functioning (PF), Role Physical (RP), Bodily Pain (BP), and general health (GH). MCS consists of Vitality (VT), Social Functioning (SF), Role Emotional (RE) and Mental Health (MH). The score of SF 36 V2 ranges between 0-100 and a higher score on SF 36 V2 indicates a better quality of life.

Before starting the study ethical clearance from the institutional ethics committee and permission from the hospital authorities were obtained. Written consent was obtained from each patient. The researcher developed the educational intervention programme on self-management of diabetes. The researcher personally interviewed each subject with the interview schedule. To avoid contamination recruitment was done to the control group first by half of the total patients (70) and then to the experimental group (70). During the baseline data collection, socio demographic and clinical data were collected.

Experimental group

The patients in the experimental group were exposed to educational intervention. It consisted of one teaching session of 60-90 minutes, limited to 2-3 patients/ group or individually. The content of session include information on diabetes, risk factors of diabetes, clinical manifestation, complication and management of diabetes mellitus. The instructional material was distributed to the patients. They were regularly followed up on monthly basis. Reinforcement of educational intervention was given on repeated monthly visit to the experimental group. The investigator spoke with each patient at every visit, adequate time was given for each patient to express questions and/or answers.

Control group

The patient in the control group received only standard treatment available in the diabetic clinic. They were not exposed to the educational intervention.

Outcome measurement

Quality of life was measured using SF 36 v2 questionnaire at baseline and follow up visits after 3 and
6 months.

RESULTS

The mean age of the patients in the experimental group was 56.81 ± 10.80 and that of the patients in the control group was 55.89 ± 10.62. 52.85% of patients in the experimental group and 47.15% of patients in the control group were males. With respect to education, 55.72% of patients in the experimental group and 41.43% of patients in the control group had intermediate education. 55.70% of patients in the experimental group and 44.3% in the control group had family history of diabetes. The mean duration of diabetes in the experimental group and control group was 10.86 ± 8.49 and 10.85 ± 8.10 respectively. The baseline characteristic of patients are shown in Table 1.

Table 1: Socio demographic data of patient

<table>
<thead>
<tr>
<th></th>
<th>Experimental group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age(years)</td>
<td>56.81±10.80</td>
<td>55.89±10.62</td>
</tr>
<tr>
<td>Gender -Male</td>
<td>52.85%</td>
<td>47.15%</td>
</tr>
<tr>
<td>Education - Intermediate</td>
<td>55.72%</td>
<td>41.43%</td>
</tr>
<tr>
<td>Family history of diabetes</td>
<td>55.70%</td>
<td>44.3%</td>
</tr>
<tr>
<td>Mean duration of diabetes (years)</td>
<td>10.86±8.49</td>
<td>10.85±8.10</td>
</tr>
</tbody>
</table>

Table 2: Distribution of patients according to initial SF 36 V2 QoL scores

<table>
<thead>
<tr>
<th>SF-36 component</th>
<th>Experimental group (N=70)</th>
<th>Control group (N=70)</th>
<th>t</th>
<th>p</th>
<th>S/NS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Physical functioning(PF)</td>
<td>38.92</td>
<td>10.01</td>
<td>35.64</td>
<td>9.68</td>
<td>1.97</td>
</tr>
<tr>
<td>Role Physical (RP)</td>
<td>36.54</td>
<td>11.55</td>
<td>34.56</td>
<td>11.72</td>
<td>1.01</td>
</tr>
<tr>
<td>Bodily Pain(BP)</td>
<td>40.50</td>
<td>11.87</td>
<td>40.90</td>
<td>12.21</td>
<td>0.20</td>
</tr>
<tr>
<td>General Health (GH)</td>
<td>40.65</td>
<td>7.94</td>
<td>37.81</td>
<td>8.13</td>
<td>2.09</td>
</tr>
<tr>
<td>Vitality(VT)</td>
<td>45.80</td>
<td>10.63</td>
<td>42.45</td>
<td>9.13</td>
<td>2.00</td>
</tr>
<tr>
<td>Social Functioning(SF)</td>
<td>40.48</td>
<td>9.58</td>
<td>38.29</td>
<td>10.14</td>
<td>1.31</td>
</tr>
<tr>
<td>Role Emotional (RE)</td>
<td>30.45</td>
<td>12.80</td>
<td>29.49</td>
<td>13.08</td>
<td>0.44</td>
</tr>
<tr>
<td>Mental Health (MH)</td>
<td>37.35</td>
<td>13.54</td>
<td>35.06</td>
<td>12.63</td>
<td>1.03</td>
</tr>
<tr>
<td>Physical Component Summary(PCS)</td>
<td>41.62</td>
<td>8.67</td>
<td>39.93</td>
<td>8.76</td>
<td>1.15</td>
</tr>
<tr>
<td>Mental Component Summary(MCS)</td>
<td>37.10</td>
<td>11.32</td>
<td>35.28</td>
<td>10.90</td>
<td>0.97</td>
</tr>
</tbody>
</table>

Table 2 shows the initial SF 36 V2 quality of life scores of patients. The above table revealed that quality of life of patients in both the experimental group and control group were less in the initial assessment.
Table 3: Comparison of mean difference in SF 36 v2 QoL scores - 3 months vs. initial between the experimental group and control group

<table>
<thead>
<tr>
<th>SF-36 component</th>
<th>Experimental group (N=70)</th>
<th>Control group (N=70)</th>
<th>Levene's F test</th>
<th>Modified t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean difference</td>
<td>SD</td>
<td>Mean difference</td>
<td>SD</td>
<td>t=9.92</td>
</tr>
<tr>
<td>PF(3-0)</td>
<td>-1.51</td>
<td>4.96</td>
<td>13.54</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>RP(3-0)</td>
<td>-1.17</td>
<td>4.52</td>
<td>27.75</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>BP(3-0)</td>
<td>-1.93</td>
<td>6.79</td>
<td>2.32</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>GH(3-0)</td>
<td>-1.26</td>
<td>3.91</td>
<td>23.53</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>VT (3-0)</td>
<td>-1.36</td>
<td>4.65</td>
<td>10.97</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>SF(3-0)</td>
<td>-1.40</td>
<td>4.61</td>
<td>8.89</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>RE(3-0)</td>
<td>-2.50</td>
<td>7.67</td>
<td>6.64</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>MH(3-0)</td>
<td>-2.02</td>
<td>4.10</td>
<td>28.84</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>PCS(3-0)</td>
<td>-0.88</td>
<td>5.67</td>
<td>4.52</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>MCS(3-0)</td>
<td>-2.21</td>
<td>4.33</td>
<td>12.76</td>
<td>0.0001*</td>
<td></td>
</tr>
</tbody>
</table>

* Significant (p<0.05)

Table 4: Comparison of mean difference in SF- 36 v2 QoL scores - 6 month vs. initial between the experimental group and control group

<table>
<thead>
<tr>
<th>SF-36 component</th>
<th>Experimental group (N=70)</th>
<th>Control group (N=70)</th>
<th>Levene's F test</th>
<th>Modified t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean difference</td>
<td>SD</td>
<td>Mean difference</td>
<td>SD</td>
<td>t=9.93</td>
</tr>
<tr>
<td>PF(6-0)</td>
<td>-1.51</td>
<td>5.32</td>
<td>9.80</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>RP(6-0)</td>
<td>-1.47</td>
<td>4.70</td>
<td>24.75</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>BP(6-0)</td>
<td>-2.39</td>
<td>7.00</td>
<td>1.75</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>GH(6-0)</td>
<td>-1.93</td>
<td>3.56</td>
<td>30.49</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>VT (6-0)</td>
<td>-2.15</td>
<td>4.96</td>
<td>7.89</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>SF(6-0)</td>
<td>-1.37</td>
<td>5.04</td>
<td>7.73</td>
<td>0.0001*</td>
<td></td>
</tr>
</tbody>
</table>

* Significant (p<0.05)
Quality of life outcomes between the experimental and control group were compared using non parametric method (modified t test). The above tables (Tables 3 and 4) revealed that there was mean increase in the individual domains and in overall PCS (Physical Component Summary) and MCS (Mental Component Summary) scores of quality of life in the experimental group, whereas there was a mean decrease of scores in the individual domains and in overall PCS and MCS scores in the control group, that were found to be statistically significant and concluded that educational intervention was effective in improving the quality of life of patients with type 2 diabetes mellitus.

**DISCUSSION**

The present study revealed that there was increase in all the individual and overall the Physical Component Summary score and Mental Component Summary score in the experimental group, where was a mean decrease in the control group (3months vs. initial and 6 months vs. initial), which was found to be statistically significant. The result showed that educational intervention had significant effect on glycemic level in patients with type 2 diabetes mellitus.

The findings of this study were consistent with the observations of Baghianimoghada, who observed that education as an intervention caused an increase in scores of the various dimensions of QoL.\(^\text{10}\)

The potential importance of diabetes self-management on quality of life was supported in a meta-analysis by Cochran & Conn, who compared 20 studies yielded 1,892 patients. The comparison between treatment group and control group outcomes following interventions yielded an effect size of 0.281, means that interventions to improve self-management resulted in increased quality of life, but control patients did not experience improved quality of life.\(^\text{11}\)

Riaz et al., in their study conducted at Karachi, Pakistan on HRQoL in diabetes patients stated that diabetes education was associated with increase in quality of life components in new and follow-up patients. Quality of Life was better in regular follow up patients receiving diabetes education compared to newly registered patients’ with diabetes.\(^\text{12}\)

**CONCLUSION**

The findings of the study are important because health care is increasingly focused not only on decreasing morbidity, mortality and cost of care but also on increasing QoL especially among those with chronic disease like diabetes. Diabetes requires the patient to self-manage their disease and is a life long struggle to maintain and improve QoL. Diabetes education plays a key role in providing patients with necessary information and to improve their skill to self-manage their diabetes. Diabetes education should be an integral part of diabetes management because improvement in health related quality of life is the ultimate goal in the treatment of diabetes. Acknowledgement: The author is thankful to all the participants

**Conflict of Interest** – Nil

**Source of Funding** – Self

**Ethical Clearance** – Ethical clearance for conducting the study was obtained from the institutional Ethics Committee, Govt. medical College, Thrivananthapuram. Written informed consent was obtained from the study participants.
REFERENCE


A Study to Assess Stigma and Discrimination Associated with Tuberculosis in 18 Year and above Patients Attending CHC Hapur

P N Bhise¹, Akhilesh Kumar Malhotra², Sandhya Nirmal Bhise³
¹Professor and Head of Deptt. ²Associate Professor. ³Health Educator; Deptt. of Community Medicine, Rama Medical College Hospital and Research Centre, Hapur, UP

ABSTRACT

Aims and Objectives- To assess the stigma and discrimination associated with tuberculosis among patients attending CHC Hapur.

Method- A crossectional study was conducted during Feb 2017 among 463 patients attending CHC Hapur. Information was collected with reference to stigma and discrimination associated with tuberculosis. Univariate analysis was done to assess statistical significance of association of various socio-demographic factors and stigma and discrimination regarding tuberculosis.

Results- A total of 463 patients was included in study. 8.6% of respondents would hide their illness (if they have tuberculosis) and reluctant to disclose to anyone. This stigma associated with tuberculosis is more in males, respondents with urban domicile and age group 25-35 years. Only 12.7% of respondents want to stay away from TB patients. This discrimination associated with tuberculosis is more in males, respondents with rural domicile and age group 45-55 years. Discrimination associated with tuberculosis is significantly related to gender ( p value< 0.01). 46.8% of respondents would feel frightened, 43.9 % would feel sad and 8.6 would feel embarrassed if they came to know that they have Tuberculosis

Conclusion- It is essential to adopt the support strategies and supplement the effort in advocacy, communication and social mobilization to mitigate the social stigma and discrimination associated with tuberculosis which is necessary for successful health program.

Keywords- stigma, discrimination, tuberculosis, gender

INTRODUCTION

Tuberculosis is major public health problem in India. In 2015 28 lakh cases occur and 4.8 lakh people died due to it¹. India accounts for ¼ th of global TB burden.² Tuberculosis is considered as social disease with medical aspects. Many interrelated social factors are associated with it such as poor socioeconomic status, poor housing and overcrowding, illiteracy and lack of awareness etc. TB patients has to bear dual suffering one due to disease and other due to stigma and discrimination attached to it. They are inhibited in disclosing their illness and attending social functions in fear of being neglected person.

Social stigma is an undesirable or discrediting attribute that an individual possesses, thus reducing that individual status in the eyes of society³. Stigma and discrimination is major cause of patient non-compliance and adversely affects initiation maintenance and completion of treatment.

Corresponding author:
Dr. Akhilesh Kumar Malhotra
Associate Professor, Deptt. of Community Medicine
Rama Medical College Hospital and Research Centre.
Highway -24, Hapur UP, Contact Number-9953217059
E-mail- drakhi512@yahoo.co.in
The present study is an attempt to assess stigma and discrimination associated with tuberculosis among 18 years and above patients attending CHC Hapur.

**MATERIALS AND METHOD**

A facility based cross-sectional study was carried out during Feb. 2017 among patients attending CHC Hapur. Patients was interviewed using predesigned and pretested questionnaire. The questionnaire contains details of socio-demographic characteristics of respondents and questions to assess stigma and discrimination associated with tuberculosis.

463 Patients aged 18 years and above were included in the study. Ethical approval for the study was obtained from administration of the hospital and oral consent was obtained from all the participant before obtaining data.

The required sample size calculated using the formula required for determination of sample size for estimating single proportion. Based on the assumption that 50% of the study participants had stigma and discrimination associated with TB with additional assumption of 95% confidence interval, 5% margin of error, and 10% non response rate in our estimate total minimum sample of 422 was needed.

Data thus gathered was analyzed using SPSS software version 16. Statistical test of significance (chi-square test) was applied wherever found necessary. (p< 0.05 was considered statistically significant)

**RESULTS**

Demographic characteristics of study population was depicted in table 1. Majority of respondents (61.5%) belongs to 18-35 years age group.38.2 % were illiterates 44.1 % were males and approx. 2/3 rd resides in rural area.

Table 2 depicts that 46.8% of respondents would feel frightened, 43.9 % would feel sad and 8.6 would feel embarrassed if they came to know that they have Tuberculosis.

As depicted in table 3, 65.2% of respondents sympathizes with TB patients and wants to help them. Only12.7% of respondents want to stay away from them because of fear of transmission or hatred. This discrimination associated with tuberculosis is more in males, respondents with rural domicile and age group 45-55 years. Discrimination associated with tuberculosis is significantly related to gender ( p value< 0.01)

Table 4 shows that 8.6% of respondents would hide their illness ( if they have tuberculosis) and reluctant to disclose to anyone. This can lead to delay in diagnosis and treatment and increase risk of transmission to healthy community. While majority of respondent (91.3%) (if they have tuberculosis ) disclose their illness to parents/ health worker/ doctor. This stigma associated with tuberculosis is more in males, respondents with urban domicile and age group 25-35 years.

**Table-1: Demographic characteristics of study population**

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Age Group</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>18-25 years</td>
<td>145</td>
<td>31.3</td>
</tr>
<tr>
<td>2.</td>
<td>25-35 years</td>
<td>140</td>
<td>30.2</td>
</tr>
<tr>
<td>3.</td>
<td>35-45 years</td>
<td>69</td>
<td>14.9</td>
</tr>
<tr>
<td>4.</td>
<td>45-55 years</td>
<td>62</td>
<td>13.4</td>
</tr>
<tr>
<td>5.</td>
<td>55-65 years</td>
<td>31</td>
<td>6.7</td>
</tr>
<tr>
<td>6.</td>
<td>65 years and above</td>
<td>16</td>
<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td>463</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Table-2: Feelings of respondents**

<table>
<thead>
<tr>
<th>Feelings</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frightened</td>
<td>220</td>
<td>46.8</td>
</tr>
<tr>
<td>Sadness</td>
<td>202</td>
<td>43.9</td>
</tr>
<tr>
<td>Embarrassment</td>
<td>39</td>
<td>8.6</td>
</tr>
<tr>
<td>Total</td>
<td>463</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table-3: Stigma associated with tuberculosis**

<table>
<thead>
<tr>
<th>Stigma</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sympathizes</td>
<td>304</td>
<td>65.2</td>
</tr>
<tr>
<td>Stay away</td>
<td>68</td>
<td>12.7</td>
</tr>
<tr>
<td>Total</td>
<td>463</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table-4: Residence**

<table>
<thead>
<tr>
<th>Residence</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>301</td>
<td>65</td>
</tr>
<tr>
<td>Urban</td>
<td>162</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>463</td>
<td>100</td>
</tr>
</tbody>
</table>
Table -2: Reaction of study population if they would came to know that they had tuberculosis.

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Reaction</th>
<th>Frequency</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fear</td>
<td>222</td>
<td>46.8</td>
</tr>
<tr>
<td>2</td>
<td>Surprise</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>3</td>
<td>Embrassement</td>
<td>41</td>
<td>8.6</td>
</tr>
<tr>
<td>4</td>
<td>Sadness</td>
<td>208</td>
<td>43.9</td>
</tr>
</tbody>
</table>

Table-3: Discrimination towards tuberculosis patients vs sociodemographic characteristics.

<table>
<thead>
<tr>
<th>S.n.</th>
<th>Response- sympathy and wants to help them (percentage)</th>
<th>Response- Fear and stay away from them (percentage)</th>
<th>No response (percentage)</th>
<th>Total percentage</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL</td>
<td>302(65.2)</td>
<td>59(12.7)</td>
<td>102(22.0)</td>
<td>463(100)</td>
<td></td>
</tr>
<tr>
<td>AGE(yrs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>18-25</td>
<td>96(66.2)</td>
<td>17(11.7)</td>
<td>32(22)</td>
<td>145(100)</td>
</tr>
<tr>
<td>2</td>
<td>25-35</td>
<td>92(65.7)</td>
<td>16(11.4)</td>
<td>32(22.8)</td>
<td>140(100)</td>
</tr>
<tr>
<td>3</td>
<td>35-45</td>
<td>43(62.3)</td>
<td>10(14.5)</td>
<td>16(23.2)</td>
<td>69(100)</td>
</tr>
<tr>
<td>4</td>
<td>45-55</td>
<td>41(66.1)</td>
<td>11(17.7)</td>
<td>10(16.1)</td>
<td>62(100)</td>
</tr>
<tr>
<td>5</td>
<td>55-65</td>
<td>18(58)</td>
<td>4(13)</td>
<td>9(29)</td>
<td>31(100)</td>
</tr>
<tr>
<td>6</td>
<td>65 and above</td>
<td>12(75)</td>
<td>1(6.2)</td>
<td>3(18.7)</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>302(65.2)</td>
<td>59(12.7)</td>
<td>102(22)</td>
<td>463</td>
<td></td>
</tr>
<tr>
<td>GENDER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Male</td>
<td>112(54.9)</td>
<td>35(17.1)</td>
<td>57(27.9)</td>
<td>204(100)</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>190(73.3)</td>
<td>24(9.2)</td>
<td>45(17.3)</td>
<td>259(100)</td>
</tr>
<tr>
<td>Total</td>
<td>302(65.2)</td>
<td>59(12.7)</td>
<td>102(22)</td>
<td>463</td>
<td></td>
</tr>
<tr>
<td>LITRACY STATUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Illiterate</td>
<td>120(67.8)</td>
<td>20(11.3)</td>
<td>37(20.9)</td>
<td>177(100)</td>
</tr>
<tr>
<td>2</td>
<td>Primary school/just literate</td>
<td>11(34.4)</td>
<td>5(15.6)</td>
<td>16(50)</td>
<td>32(100)</td>
</tr>
<tr>
<td>3</td>
<td>Middle school</td>
<td>29(61.7)</td>
<td>5(10.6)</td>
<td>13(27.6)</td>
<td>47(100)</td>
</tr>
<tr>
<td>4</td>
<td>High school</td>
<td>67(65.0)</td>
<td>12(11.6)</td>
<td>24(23.3)</td>
<td>103(100)</td>
</tr>
<tr>
<td>5</td>
<td>Intermediate/diploma</td>
<td>48(73.8)</td>
<td>12(18.4)</td>
<td>5(7.7)</td>
<td>65(100)</td>
</tr>
<tr>
<td>6</td>
<td>Graduate</td>
<td>21(67.7)</td>
<td>4(12.9)</td>
<td>6(19.3)</td>
<td>31(100)</td>
</tr>
<tr>
<td>7</td>
<td>Post graduate/professional</td>
<td>6(75)</td>
<td>1(12.5)</td>
<td>1(12.5)</td>
<td>8(100)</td>
</tr>
<tr>
<td>Total</td>
<td>302(65.2)</td>
<td>59(12.7)</td>
<td>102(22)</td>
<td>463</td>
<td></td>
</tr>
<tr>
<td>RESIDENCE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Rural</td>
<td>185(61.4)</td>
<td>43(14.3)</td>
<td>73(24.2)</td>
<td>301(100)</td>
</tr>
<tr>
<td>2</td>
<td>Urban</td>
<td>117(72.2)</td>
<td>16(9.8)</td>
<td>29(18)</td>
<td>162(100)</td>
</tr>
<tr>
<td>Total</td>
<td>302(65.2)</td>
<td>59(12.7)</td>
<td>102(22)</td>
<td>463</td>
<td></td>
</tr>
</tbody>
</table>
Table 4-Stigma Associated with tuberculosis vs sociodemographic characteristics.

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Response-do not disclose illness to anyone</th>
<th>Response-disclose illness (to parents/health workers/doctor)</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall</td>
<td></td>
<td>463(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>AGE(yrs)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>18-25</td>
<td>13(9)</td>
<td>145(100)</td>
<td>P &gt;0.05(x^2=2.201,df=5,p=0.821)</td>
</tr>
<tr>
<td>2</td>
<td>25-35</td>
<td>14(10)</td>
<td>140(100)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>35-45</td>
<td>3(4.3)</td>
<td>69(100)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>45-55</td>
<td>6(9.6)</td>
<td>62(100)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>55-65</td>
<td>3(9.6)</td>
<td>31(100)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>65 and above</td>
<td>1(6.2)</td>
<td>16(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>GENDER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Male</td>
<td>28(13.7)</td>
<td>204(100)</td>
<td>P &lt;0.05(x^2=11.952,df=1,p=0.001)</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>12(4.6)</td>
<td>259(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>LITRACY STATUS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Illiterate</td>
<td>19(10.7)</td>
<td>177(100)</td>
<td>P &gt;0.05(x^2=11.483,df=6,p=0.075)</td>
</tr>
<tr>
<td>2</td>
<td>Primary school/just literate</td>
<td>6(18.7)</td>
<td>32(100)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Middle school</td>
<td>3(2)</td>
<td>47(100)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>High school</td>
<td>6(5.8)</td>
<td>103(100)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Intermediate/diploma</td>
<td>1(1.5)</td>
<td>65(100)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Graduate</td>
<td>4(12.9)</td>
<td>31(100)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Post graduate/professional</td>
<td>1(12.5)</td>
<td>8(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>RESIDENCE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Rural</td>
<td>22(7.3)</td>
<td>301(100)</td>
<td>P &gt;0.05(x^2=2.086,df=2,p=0.352)</td>
</tr>
<tr>
<td>2</td>
<td>Urban</td>
<td>18(11.1)</td>
<td>162(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td>463(100)</td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

In the present study, 46.8% of respondents would feel frightened, 43.9% would feel sad and 8.6 would feel embarrassed if they came to know that they have Tuberculosis.

Only 12.7% of respondents want to stay away from TB patients. This discrimination associated with tuberculosis is more in males, respondents with rural domicile and age group 45-55 years. Discrimination associated with tuberculosis is significantly related to gender (p value < 0.01).

8.6% of respondents hide their illness (if they have tuberculosis). This stigma associated with tuberculosis is more in males, respondents with urban domicile and age group 25-35 years.

In a study by Dhingra et al4 in Delhi among TB patients, 60% of patients hiding their disease from friends or neighbors In contrast to present study, gender wise it was observed that stigma was significantly more among females.(p < 0.05).

A study by Jangid et al5 among TB patients in Rajasthan describes that half of TB patients ashamed of having TB and about 75% of patients hide their illness because of Tuberculosis.

Stigma in tuberculosis is usually of two types6 one i.e. a fear of patient about others behavior to him and a sense of inferiority due to development of tuberculosis i.e. perceived stigma and other due to actual discrimination or being actually avoided by the people since patients has now tuberculosis i.e. enacted stigma.

In a study by Jaggarajamma et al7 among TB patients in Tamilnadu, perceived stigma was higher than enacted stigma in both genders in context of personal, family, community and workplace interactions.

CONCLUSION

Present study highlights the stigma and discrimination faced by Tuberculosis patients which can adversely affect early detection and treatment adherence. Gender is identified as significant determinant. Planners and policy makers need to pay attention to this psychosocial dysfunction and put comprehensive effort to educate the community them by reduce social suffering faced by tuberculosis patients.

Conflict of Interest – Nil

Source of Funding – Self

Ethical Clearance- Yes

REFERENCES

1. RNTCP Annual status report 2017, Central TB division, CGHS, Ministry of health and family welfare, Govt. of India.
Histopathological Review of Dermatological Disorders with a Keynote to Granulomatous Lesions: A Retrospective Study

Ankit Singh¹, Amit Kumar Nirmal¹, Prapti Gupta², Jay Kant Jha²

¹Post Graduate II³ year, Department of Pathology, Saraswathi Institute of Medical Sciences Hapur (U.P), ²Senior Resident, Department of Pathology, University College of Medical Sciences, Dilshad Garden, Delhi, ³Post Graduate I³ year, ⁴Professor, Department of Pathology Saraswathi Institute of Medical Sciences Hapur (U.P)

ABSTRACT

Background: The spectrum of dermatologic disorders varies greatly according to geographical distribution, gender, age, and co-existing disorders. The objective of this study was to determine the histopathological profile of dermatological lesions, to study morphology and attempt to identify the etiology of granulomatous lesions on skin biopsies in a rural population of our set-up.

Materials and Method: This is a retrospective study over a period of 2 years from July 2014 to June 2016 was carried out in the Department of Pathology, Saraswathi Institute of Medical Sciences and associated Hospital, Hapur, Uttar Pradesh, India. The data of 180 skin biopsies received for histopathological examination were reviewed. Slides stained with routine stain and special stains like Ziehl–Neelsen stain and periodic acid-Schiff.

Results: Out of 90 cases, 19 (21.11%) cases of non-specific dermatitis, 22 cases (24.44%) of granulomatous lesions, followed by 10 (11.11%) cases of psoriasiform dermatitis, 3 cases of vesiculobullous and vesiculopustular diseases, and 2 (2.22%) cases were reported as connective tissue disorders. Pigmentary disorders of the skin were reported in 3 (3.33%), 10 (11.11%) cases of tumors and cysts of the epidermis and a miscellaneous category, 2 (2.22%) cases. Leprosy accounted for 15 cases of granulomatous lesions followed by 2 cases of lupus vulgaris.

Conclusion: The incidence of skin lesions was observed to occur more frequently in males and in the age group of 21-30 years. Granulomatous dermatitis is still rampant with infections predominantly leprosy and tuberculosis as the leading causes.

Keywords: Bullous lesions, Granulomatous, Histopathology, Papulosquamous diseases, Vesicles.

INTRODUCTION

The pattern of skin diseases varies from country to country and various regions within the same country.¹ Occasionally, skin diseases may be alone manifestation of systemic diseases. Skin diseases are also influenced by various factors such as environment, economy, literacy, racial, and social customs.² It is more so in our country with a tropical climate, with a wide difference in socio-economic status, diverse religions, and customs in different parts of the country.³ Granulomatous dermatitis frequently poses a diagnostic challenge to dermatopathologists, as has been discussed in few studies,⁴⁵ since an identical histological picture is produced by several causes and conversely, a single cause may produce varied histological patterns.

MATERIALS AND METHOD

This retrospective study was carried out in the
Department of Pathology, Saraswathi Institute of Medical Sciences and associated Hospital, Hapur, over a period of 2 years from July 2014 to June 2016. Clinical history and relevant data were recorded from request forms of biopsies received. Slides stained with routine hematoxylin and eosin stain and special stains such as Ziehl–Neelsen (ZN) stain, periodic acid-Schiff, and Congo red for amyloid were reviewed. From the histopathology section reporting point of view, the skin is divided into four anatomical compartments or units:

1. The first compartment/unit includes the epidermis, papillary dermis, and superficial vascular plexus

2. The second compartment/unit consists of the reticular dermis and the deep vascular plexus

3. The third compartment/unit consists of the pilosebaceous units, the eccrine glands, and in certain anatomical locations, the apocrine glands

4. The fourth compartment/unit is the subcutaneous tissue (panniculum).

Ideally the skin biopsy should consist of all four compartments along with hair follicles. A 4 mm punch biopsy is preferred, and usually adequate for the histological evaluation of most inflammatory dermatoses. A superficial or shave biopsy should be avoided, because it might be misleading, producing an erroneous pattern and diagnosis.

RESULTS

A total of 90 cases were studied during the study period and classified into different age groups. The age distribution pattern revealed that the maximum biopsies received were in the age range of 21-30 years, and the least number were in the age range of 0-10 years (Table 1). Out of these patients, 51 cases (56.67%) males and 39 cases (43.33%) females. A classification of categories of all histological diagnoses is presented in Table 2. The frequencies and percentages were “non-specific dermatitis” n = 19 (21.11%), followed by granulomatous lesions n = 22 (24.44%). 8 cases of vacuolar interface dermatitis were observed (erythema multiforme-2, phototoxic dermatitis-1, lichen sclerosus atrophicus-1, lupus erthematosus-3, and pigmented purpuric dermatitis-1). A total of 7 cases of lichenoid eruptions were seen which included 3 cases of lichen planus, 2 each of pityriasis lichenoid chronic and post-inflammatory hyperpigmentation. A total of 22 (24.44%) cases with granulomas were observed (Table 3). 5 cases of malignant tumors were observed comprising of basal cell carcinoma (3 cases), squamous cell carcinoma (1 cases), and basosquamous carcinoma (1 case). Benign tumors and cyst comprise of 5 cases. These include tumors with any epithelioma component (e.g., with seborrhic keratosis n = 1), papilloma n = 1, pilomatrixoma n = 1, apocrine adenoma n = 1, and condyloma acuminate n = 1. A total of 22 (24.44%) cases with granulomas were observed. The most common etiology recorded was leprosy accounting for 15 cases followed by 2 cases of lupus vulgaris. Leprosy cases were further classified into sub-groups according to Ridley and Jopling. The majority of the cases were tuberculoid leprosy (TT) followed by lepromatous leprosy.

Table 1: Distribution of dermatologic lesions according to age groups

<table>
<thead>
<tr>
<th>Age group (yrs)</th>
<th>Number of patients</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>7</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>11-20</td>
<td>16</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>21-30</td>
<td>18</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>31-40</td>
<td>13</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>41-50</td>
<td>14</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>51-60</td>
<td>10</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>&gt;60</td>
<td>12</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>51</td>
<td>39</td>
</tr>
</tbody>
</table>

Table 2: Detailed distribution of skin lesions on the basis of histological diagnosis

<table>
<thead>
<tr>
<th>Skin lesions</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-specific dermatitis</td>
<td>19(21.11)</td>
</tr>
<tr>
<td>Psoriasiform dermatitis</td>
<td>10(11.11)</td>
</tr>
<tr>
<td>Interface dermatitis with lichenoid eruptions</td>
<td>7(7.78)</td>
</tr>
<tr>
<td>Interface dermatitis with vacuolar interface lesions</td>
<td>6(6.67)</td>
</tr>
<tr>
<td>Spongiotic dermatitis</td>
<td>2(2.22)</td>
</tr>
<tr>
<td>Granulomatous lesions</td>
<td>22(24.44)</td>
</tr>
<tr>
<td>Vesiculobullous lesions</td>
<td>3(3.33)</td>
</tr>
<tr>
<td>Calciosis cutis</td>
<td>3(3.33)</td>
</tr>
<tr>
<td>Pigmentary disorders</td>
<td>3(3.33)</td>
</tr>
<tr>
<td>Benign tumors</td>
<td>5(5.56)</td>
</tr>
<tr>
<td>Malignant tumors</td>
<td>5(5.56)</td>
</tr>
</tbody>
</table>
Table 3: Distribution of granulomatous skin lesions according to classification and gender

<table>
<thead>
<tr>
<th>Type of lesion</th>
<th>Number of cases</th>
<th>Percentage (%)</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lupus vulgaris</td>
<td>2</td>
<td>9.1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>4</td>
<td>18.18</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Verrucous type TB</td>
<td>1</td>
<td>4.54</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>TT leprosy</td>
<td>5</td>
<td>22.72</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>BT leprosy</td>
<td>3</td>
<td>13.64</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>BL leprosy</td>
<td>1</td>
<td>4.54</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>LL leprosy</td>
<td>3</td>
<td>13.64</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Histoid leprosy</td>
<td>1</td>
<td>4.54</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Indeterminate type</td>
<td>2</td>
<td>9.1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>100</td>
<td>13</td>
<td>9</td>
</tr>
</tbody>
</table>

TB: Tuberculosis, TT: Tuberculoid leprosy, BT: Borderline tuberculoid leprosy, BL: Borderline lepromatous leprosy, LL: Lepromatous leprosy

DISCUSSION

This study has documented the histopathological profile of skin lesions at our tertiary care center with a fairly high presence of non-specific dermatoses (21.11%) and granulomatous lesions (24.44%). The sex distribution pattern revealed that most of the patients were males (56.67%). The age distribution pattern revealed that the maximum biopsies received were in the age range of 21-30 years (Table 1) with most of the patients falling below the age of 40 years. The youngest patient was 5 years old, and oldest was 74 years old. An analysis of the broad categories revealed that the most frequently encountered lesions were non-specific dermatoses (21.11%) and granulomatous lesions (24.44%) (Table 2). Inflammatory lesions are grouped initially into general categories and then specific features are sought to narrow the diagnoses. Combining the available information on the gross appearance and the clinical differential diagnosis with the histological diagnosis is the vitally important prior to rendering a final diagnosis. Dermatitis reactions may have acute, subacute, and chronic inflammatory phases with fairly specific histological correlates, incited
by external or internal antigens. Since the pathogenesis of most inflammatory dermatitidis is unknown, they are best classified using morphologic criteria.6 Psoriasiform dermatitis, observed in 10 (11.11%) cases, revealed a characteristic pattern of epidermal hyperplasia typified by elongation of the epidermal rete ridges. Interface dermatitis with lichenoid eruption was observed in 7 (7.78%) cases in our study. It refers to a morphologic alteration at the junction of epidermis and dermis with vacuolization within basilar keratinocytes or basement membrane.9 These cases had an inflammatory cell-rich dense band-like infiltrate filling the papillary dermis. Interface dermatitidis with vacuolar interface lesions had a poor density or patchy presence of inflammatory cell infiltrate in the papillary dermis and was observed in 6 (6.67% cases). Spongial dermatitis, also referred to as eczematous dermatitis, was observed in 2 cases (2.22%) in our study. It refers to the presence of spongiosis or intercellular edema that stretches apart keratinocytes along with the occasional formation of intra epidermal vesicles.6,8 Spongiosis was variable, multifocal, and accompanied by intracellular edema and exocytosis of inflammatory cells. Infectious granulomatous lesions were observed in 24.44% cases in the present study which in accordance with the study done by Mohan et al.6 The most common etiology of granuloma in our study was leprosy, accounting for 15 cases. Leprosy presents clinically as macular, infiltrative nodular and diffuse type, affecting both the skin and peripheral nerves.10 Histologically, it exhibited an extensive cellular infiltrate separated from the flattened epidermis by a narrow Grenz zone of normal collagen. In most of the cases, this infiltrate caused the destruction of the cutaneous appendages extending into the subcutaneous fat.11 The Fite-Faraco stain showed globi of lepra bacilli within the foamy macrophages (Figure 1). Erythema nodosum leprosum, a Type-2 lepra reaction, is an acute inflammatory reaction seen in a patient with borderline TT and occasionally in lepromatous subtypes.10 Here, the foci of acute inflammation superimposed on chronic leprosy were observed (Figure 2). TT was the most common lesion encountered. In our study, most of the patients with granulomatous lesions were in the 21-40 years age group. The underlying dermis showed epithelioid cell granulomas in the underlying dermis (Figure 3). Neural invasion is also frequently observed in stained sections. Studies done in Pakistan7 reveal out of a total of 97 cases of tuberculosis (TB) 17 (17.5%) were children (age <16 years) while Kumar and Muralidhar12 observed 75 children (18.7%) out of 402 cases of cutaneous TB. Cutaneous TB is a relatively rare clinical entity in western countries but is still prevalent in the developing world as in far East, where it accounts for 0.4% of patients with skin disease.13 In developing countries like India, the incidence has fallen from 2% to 0.15%. In our study, 2 out of 6 cases of TB were typified which included lupus vulgaris and TB cutis (5 cases). Cutaneous TB is an infection of the skin, and subcutis caused by Mycobacterium TB occurs by three routes, i.e., direct inoculation, hematogenous spread, and direct extension from underlying tuberculous lymph node (causing scrofuloderma). Scrofuloderma is the most common form of cutaneous TB in children. It results as a direct extension from an underlying TB focus, such as a regional lymph node or infected bone or joint, to the overlying skin.12,14,15 Here, tissue sections revealed tuberculoid granuloma surrounding areas of necrosis. In a study done by Uz Zafar et al.7 out of 47 typified cases of cutaneous TB, lupus vulgaris was the most common form, seen in 18 (38.29%) of these patients, followed by other types. Similar results were also seen by Singh10 and Kumar et al.15 who found lupus vulgaris the most common form in 44% and 48%, respectively. On the contrary, we observed an incidence of lupus vulgaris in 6 cases (17.1% among granulomatous lesions). In the present study, special stain for AFB was positive in 11.5% of all cases. According to Veena et al.11 AFB were found in 2 (6.45%) out of 31 skin biopsies in leprosy patients.

CONCLUSION

Our study showed that the incidence of skin lesions was more frequent in males and in the age group of 21-30 years. Moreover, cases where skin biopsy delivered a non-specific diagnosis, it aided in ruling out infective or malignant etiology. Granulomatous dermatitis is still rampant with infections predominantly leprosy and TB as the leading causes. Demonstration of AFB by ZN stain is specific; however, they are not detected with ease, thereby further emphasizing the significance of adequate clinical data and work up which helps in the elucidation of specific etiology.

Source of Funding-None

Ethical Permission – Taken from ethical committee of Institute

Conflict of Interest - None
REFERENCES


Leadership Style Correlation with the Occurrence of Unsafe Act Fabrication Employees Pt. BSB Gresik

Fardiansyah, Rachmat¹, Prasetya, T.A.E², Ardyanto, D¹, Notobroto, H B³

¹Department of Occupational Health and Safety, Public Health Faculty, ²Health Department, Vocational Faculty, ³Department of Biostatistic and Demographic, Public Health Faculty, Airlangga University, Indonesia

ABSTRACT

The domino theory of Heinrich said that the existence of a work accident is derived from the lack of control of the management. Many companies are aware of this and trying to implement a secure way of working in order to avoid workers from occupational accidents and company to avoid a loss of one of them is using the right leadership approach. This aims of this study to determine the relationship style of leadership with the unsafe act fabrication workers PT. X. Research design of this study is cross-sectional, observational research with quantitative approach. The sample size of this study was 40 workers, using total sampling technique. Data was analyzed using Contingency Coefficient test. The research showed more of supervisor had a transformational leadership style (80%), transactional leadership style also amounted to 7 workers (17%), while the numbering laissez faire leadership style 1 worker (3%). Workers who act safe (safe) were 34 workers (85%) and other workers had act unsafe (unsafe) were 6 workers (15%). The relationship between leadership style with the unsafe act showed contingency coefficient value of 0.674, that means there was strong relationship between leadership style with unsafe actions. So the leadership style had a strong relationship with the unsafe acts of workers. It Suggested to improve performance (safety) workers, the company have to provide leadership training to supervisors.

Keyword: Leadership, Welder, Unsafe act

INTRODUCTION

Health and Safety Executive United Kingdom in 2015/16, 30.4 million working days were lost due to self-reported work-related illness or injury¹. In Indonesia occupational accidents at 2014 to the second quarter recorded a total of 18 105 cases, of which 10 101 recovered, 7,335 cured but can not work, permanent disability and 101 343 of them died. Operating losses reached more than 2 billion rupiah and working days lost almost 5 million working days. Genesis accidents that occur according to the Indonesian Minister of Manpower and Transmigration, largely due to the lack of discipline and level of awareness of labor. The domino theory of Heinrich implies a work accident is derived from the lack of control of the management. Leadership style has a positive effect on job satisfaction, motivation and performance of employees. Research conducted² also observed that one’s style leads have different outcomes depending on the performance of work, psychological and compliance in the workplace. Measures supervisor in giving instructions and directions will be followed by the reaction of the staff and workers. Follow the instructions and directions of the leadership style of the supervisor who is also suspected of having links with worker performance that is mental or psychological conditions such as stress. Research conducted³ proved that the style of a lead supervisor has a significant relationship to the stress level of workers. The difference of leadership style, will be seen that each worker will have a different attitude towards the supervisor so appropriate to learn how to do the work performance. Variations in the

Corresponding author: Rahmat Fardiansyah
Department of Occupational Health and Safety, Public Health Faculty, Airlangga University, Indonesia
Mulyorejo Street- 60161,
Telephone No.: (+62)31-5915551
E-mail – d_dmmi@yahoo.com
supervisor’s leadership could be expected to cause the variations of the workers behavior also in Steel company Gresik. PT. Bangun Sarana Baja-Gresik is a company engaged in the fabrication and construction of steel to produce steel which is processed into a form to order contractor. The company has 21 workshops where each workshop there are some production processes such as fabrication, sandbalasting, painting, packaging. Most of the production process using a welding, grinding, cutting and painting. Each work area at PT. Bangun Sarana Baja-Gresik was inseparable from the risk of workplace accidents both workers who are in the office or workshop area. Workplace accidents can occur due to various factors, including unsafe conditions (unsafe condition) and no safe way of working (unsafe action). Workers are usually only concerned to get the job done faster, and not prioritizing safety. In other words, occupational health and safety risks that may occur is a human error or the fault of the workers that can cause accidents. The early observations known to the same job with different amounts, differences in the ability to work and provision of different targets from the supervisor led to workers taking shortcuts (shortcut) on the standard operating procedure (SOP). Each supervisor has the differences of leadership style and performance.

The Supervisor of fabrication workers at PT. Bangun Sarana Baja consists of a contractor’s workers and supervisors as permanent workers. The supervisor leadership style will followed by several workers. Based on observations SOP has been available but many workers who perform unsafe acts and it is can be influenced by the supervisor leadership style. Based on the background and studies have outlined the problems that need to be assessed on leadership style relationship with the occurrence of unsafe act at fabrication workers PT. BSB Gresik.

**METHOD**

This research was analytic observational with cross sectional design. The population in this research is all fabrication workers who work in PT. BSB as many as 40 people. Using the total sampling technique. The independent variables included age, working time, education and leadership styles while the dependent variable is unsafe act. The research instrument used questionnaires, safe behavior observation checklist, interviews and secondary data company. Data were analyzed descriptively and analytically using contingency coefficient test.

**RESULT**

The results of the study include the identification of respondents characteristics and the analysis of the leadership style with the unsafe act.

**Respondent Characteristics Of the welder at PT. BSB Gresik**

**Table 1. Respondents Characteristics at PT Holcim project BSB Gresik**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20-29 years old</td>
<td>17</td>
<td>42.5</td>
</tr>
<tr>
<td></td>
<td>30-39 years old</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>40-49 years old</td>
<td>9</td>
<td>22.5</td>
</tr>
<tr>
<td>Education</td>
<td>Junior High School</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Senior/vocational High School</td>
<td>22</td>
<td>55</td>
</tr>
<tr>
<td>Working Time</td>
<td>1-2 years</td>
<td>13</td>
<td>32.5</td>
</tr>
<tr>
<td></td>
<td>3-4 years</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>5-6 years</td>
<td>17</td>
<td>42.5</td>
</tr>
</tbody>
</table>

Table 1 show that the majority of age worker are 20-29 years were 17 workers (42.5%). The Education majority are high / vocational high school with a number of 22 workers (55%). The majority of working time are 5-6 years with the number of 17 workers (42.5%).

**2 Analysis** The relationship of leadership style with the incidence of unsafe act.

Identify the leadership style by workers has been conducted using questionnaires MLQ, in addition to identifying the characteristics of respondents who do use the questionnaire. Leadership styles that have been identified will be analyzed by unsafe acts. The results of the analysis of leadership style with welder unsafe actions can be show at Table 2.
Table 2. Relationship between leadership style with welder unsafe action at PT.BSB Gresik 2017

<table>
<thead>
<tr>
<th>Leadership Style</th>
<th>Action</th>
<th>Unsafe (f)</th>
<th>Unsafe (%)</th>
<th>Safe (f)</th>
<th>Safe (%)</th>
<th>Total (f)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unsafe</td>
<td>0</td>
<td>0</td>
<td>32</td>
<td>100</td>
<td>32</td>
<td>100</td>
</tr>
<tr>
<td>Transformasional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transactional</td>
<td></td>
<td>6</td>
<td>85,7</td>
<td>1</td>
<td>14,3</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>Leissze faire</td>
<td></td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>100</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>6</td>
<td>15</td>
<td>34</td>
<td>85</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

Contingency Coefficient=0.674

Table 2 showed the majority of the welder who act unsafe provide were from transactional leadership style (6 employees), while only one worker acted safe. All workers who judge her supervisor had transformational leadership style or leissze faire act safe. The relationship between the variables of leadership style with the action variable (unsafe) showed with contingency coefficient of 0.674, it means there is a strong relationship between leadership style with welder unsafe actions.

DISCUSSION

1. Unsafe Action

Unsafe act by 4 states that the action is not safe (unsafe action) is the action that could endanger workers and others that can cause accidents. Observations indicate that unsafe acts are still met at the workshop location. The welder does not use personal protective equipment should be worn. Welder observed unsafe acts, do not use welding goggles and helmet welding. Unsafe actions are any personal characteristics or conditions that may cause or affect a worker’s unsafe act. This condition may be the condition of mental, emotional or physical. Some types of unsafe actions, among others were do not want to use the safety equipment at work, removing the safety devices, not aware of the job dangers, lack of attention to the dangers of the job, low levels of job skills or who are not adequately trained for a specific job or work playfully. Could be a worker trying to avoid extra work or try to save time by taking a shortcut. This action may endanger himself or others who may end up with an accident 5.

Heinrich with Domini theory suggests that every accident is bound to cause. If the causative factor is removed, then by itself accidents can be prevented. There are 5 factors in a sequence which is described as five dominoes standing in line, namely : custom, one’s own mistakes, acts and unsafe conditions (hazard), accidents and injuries 6. The idea behind the domino theory was if we eliminate one of the dominoes, the possibility of losses incurred will be reduced. Heinrich found domino 3 (unsafe act / condition) is a major domino that must be removed from the circuit. The goal (eg the use of PPE) is to eliminate the domino 5 (injury) of the chain of events that although four other domino has fallen. Unsafe actions can be caused by several things and according 7 unsafe actions of a person is affected by the behavior, physical condition, knowledge and expertise as well as the conditions of the work environment. Based on that accident prevention efforts should include a variety of businesses, among others by improving the technical, persuasive action, individual adjustments with his work and with enforcing discipline (law enforcement).

2. Leadership style with unsafe acts (unsafe act).

Leadership is important in the organization as the Malcolm Baldrige National Quality Award (MBNQA) determines the highest score and the European Foundation for Quality Management (EFQM) criteria for leadership in an important position. Leadership is one of the important pillars of the five pillars of Total Quality Management (TQM), which is the ability of a leader (leaders) to influence employees to work to achieve corporate objectives 8. Leadership is important
not only in a career and organization. So, leadership is important in every sector, the community, and each country. Leadership is important because leadership is something that is compulsory in life, so that life becomes more organized and justice can be enforced, and the ability to utilize and manage the existing potential. So where was leadership becomes very important in the manufacturing industry.

According there are five approaches leadership, namely: the trait approach (trait approach), approaches the power-influence (power-influence approach), the situational approach, integrated approach (integrative approach), and behavioral approaches (behavior approach). Researchers continue to study the causal and the correlation between leadership behaviors and organizational performance. Bass formulate multifactor Leadership behaviors can be shaped Questionnaire (MLQ).

The results of this study are also used MLQ as an instrument, showed a strong correlation between leadership style with unsafe acts (unsafe act). The transactional leadership style of supervisors showed a tendency to act insecure workers, and vice versa transformational leadership style more direct the workers to act safely. Leadership style which is less involving staffs in making decisions, will cause the staffs felt was not necessary, because the decision-making related to the staffs tasks everyday. The imposition of the will by the supervisor or employer should not do. However, a leader in applying the appropriate style of leadership is a wise move to staffs, it will failure in achieving organizational goals. The leadership style used in interacting with staffs, through this interaction between supervisors and staffs each has a different status. The interaction of two different status occurs, if the status of the leader can understand the state of his staffs. In general, staffs feel protected by the leadership if the leadership can be soothing staffs to the tasks assigned to them. How to interact by the leadership will affect the organization’s objectives. Bottoms are generally more likely to accept the boss nurturing staffs so happy feeling will arise task, which in turn increases employee performance.

One form of leadership that is believed to compensate for patterns of thought and reflection new paradigm in the globalization process formulated as transformational leadership. Transformational leadership, described as a style of leadership that can arouse or motivate employees, so that they can grow and achieve performance at a high level, in excess of what they anticipated. In addition, the transformational leadership style is considered effective under the circumstances and in any culture. Transformational leadership, described as a style of leadership that can arouse or motivate employees, so that they can grow and achieve performance at a high level, in excess of what they anticipated. Leadership described as a transactional leadership that provides an explanation of what the responsibilities or duties of the staffs and rewards they can expect if the specified standard is reached. This leadership style, open in the event to share information and responsibilities to the staffs. Despite this openness is an important component in running an organization, but leadership is not enough to explain the extra effort and performance of the staffs, what really can be extracted, a leader of the employees. Therefore we need another concept, of a leader that is able to explore additional effort or performance of the staffs. So it is not just an agreement between tasks and rewards leadership and transactional to the staffs. Leadership, leader and follower acts as a principal bargaining chip in a process that involves the exchange of rewards and punishments. The main idea of transactional approach is the existence of the exchange, the leader wants what belongs followers and reply leaders will give what is desired by the followers. Thus, transactional leaders motivate staffs to act in accordance with expected through the establishment of reward and punishment. Transactional leadership has two dimensions which include: (a) Active, leaders supervise and look for irregularities on various rules and standards, as well as taking corrective action; (B) Passive, leaders intervene only when the standard is not achieved. Transactional leadership according is a style of leadership that focus on interpersonal dealings between the leader and the employee that involves the exchange relationship. The exchange is based on an agreement on the classification of targets, work standards, job assignments, and appreciation. Based on expert opinion can be deduced that the transactional leadership is leadership that involves or emphasis on rewards to motivate staffs, meaning the transactional leadership style has behavioral characteristics motivate the staffs by rewarding appropriate (contingen reward) and the management as necessary (management by exception)

CONCLUSIONS

The conclusion of this research are:
The majority of workers aged were 20-29 years, the
education were high / vocational high school, with the
working time 5-6 years old.

The supervisor’s leadership style used is the
transformational style (80%), followed by transactional
style (17%) and laissez faire (1%)

Leadership style has a strong relationship with the
unsafe acts of workers.

**SUGGESTIONS**

Advice can be given to companies are:

Provide training to supervisors regarding the
leadership to improve performance (safety) workers.

To re-training to employees regarding the use of
PPE welding, especially for the new welder.

Clarify and increase the minimum qualifications
(certificates) for the welder.

Conflict of Interest, Ethical clearance & Source of
interest.

We intend to publish an article entitled
“LEADERSHIP STYLE CORRELATION WITH THE
OCCURRENCE OF UNSAFE ACT FABRICATION
EMPLOYEES PT. BSB GRESIK”. On behalf of all the
contributors I will act as guarantor and will correspond
with the journal from this point onward.

**Ethical Clearance**- Taken from Health Research
Ethics Committee Public Health Faculty, Airlangga
University, Indonesia

**Source of Funding** - NIL

**Conflicts of Interest**- NIL

We have done sufficient work in the field to justify
authorship of this article. We hereby transfer, assign, or
convey all copyright ownership, including any and all
rights incidental thereto, exclusively to the journal, in
the event that such work is published by the journal.

**REFERENCE**

.htm

Kepemimpinan Serta Penerapan Reward dan
Punishment Terhadap Kepatuhan Pekerja dalam
Melaksanakan Program K3 (Studi pada PT. Liku

Situasional Supervisor dengan Tingkat Stress
Kerja.Skripsi. Universitas Airlangga.

Industrial Accident Prevention. 5th ed. USA:
McGraw-Hill.

Manajemen Risiko Dalam Perspektif K3. Dian
Rakyat: Jakarta.

Keselamatan dan Kesehatan Kerja: Panduan
Penerapan Berdasarkan OHSAS 18001 dan
Permenaker 05/1996. PPM: Jakarta.

Kecelakaan Fatal Jatu dari Kapal pada Transportasi
Air Survei Seismik 2D PT.X di Simenggariis
Kalimantan Timur Tahun 2010. Tesis. Universitas
Indonesia.

Ghalia: Bogor.

the Challenge. Erlanga: Jakarta.

Prentice- Hall: New Jersey.

Manufacturing Environment: An Analysis Based
on the Multifactor Leadership Questionnaire.
Journal of SAM Advanced Management.

Transformational Leadership : Learning to
Share the Vision. Organizational Dynamics.
Organizational Dynamics. 8(1): 9-32.

Studi Deskriptif Gaya Kepemimpinan dan Kinerja
Karyawan di PT. Galang Buana Sentosa. Jurnal
Agora. Vol 1 (3).


Performance Beyond Expectation. Free Press:
New York.

assessment of Bass’s (1985) conceptualization of
transactional and transformational leadership.
Relationship between Underweight and Academic Achievement among Middle School Children

Neha Bansal
Guest Faculty, Department of Home Science, University of Allahabad, Allahabad, India

ABSTRACT

Underweight represents depleted body fat or lean tissue store and reflects both acute and chronic undernutrition. Under nutrition during the school years can retard child’s physical and cognitive development leading to impaired learning abilities. The purpose of the present study was to determine the relationship between underweight and academic performance in middle school children. A cross sectional study was carried out in three coeducational schools of Allahabad city- Maharishi Patanjali Vidya Mandir, Tagore Public School and YMCA Centenary School and College. A total of 909 school children from 6th to 8th standards aged between 11 to 13 years were studied. Weight and height of children were measured and Body Index Mass (BMI) was calculated. Children with Body Mass Index below 5th percentile were considered as underweight. 34 identified underweight children as cases and 34 identified normal weight children as controls were selected. While selecting controls, it was kept in mind to maintain the similarity of age, gender and class between case and control. Cumulative Grade Point Average (CGPA) , Math, English and Science grade were recorded from the school register to evaluate children’s academic achievement. Chi square test was used for statistical analysis. In the study overall prevalence of overweight, obesity and underweight was 20.2%, 9.0% and 3.8% respectively among middle school children. The proportion of overweight and obesity was found higher among boys (21.9% and 10.9%) as compared to girls (17.6% and 6.2%) whereas the proportion of underweight was found higher among girls (4.8%) than boys (3.1%). On comparison between the underweight and normal weight children’s academic achievement results of the study reveal that higher proportion of underweight children (29.4%, 55.9%,41.2% and 55.9%) obtained poor grade compared to normal weight children (11.7%, 35.3%, 20.6% and 52.9%) in Cumulative Grade Point Average (CGPA), Math, English and Science respectively but the difference was not found significant (p>0.05) statistically. Further studies are required to understand the relation between underweight and academic achievement in children and adolescents.

Keywords: Underweight, Body Mass Index, Academic Performance.

INTRODUCTION

Underweight, according to World Health Organization, is defined as a BMI below the 5th percentile for age and gender\(^1\). It represents depleted body fat and/ or lean tissue store and reflects both acute and chronic undernutrition. Poor nutrition due to inadequate dietary intake of energy and nutrients during the school years results in underweight, stunted growth, thinness/wasting, low resistance to infection, poor cognitive development and impaired learning abilities. Stunting (low height for age) is associated with long term consequences such as impaired intellectual achievement and school performance\(^2,3\) and also leads to reduction in adult body size and as a result, reduced work capacity and obstetric complications\(^3\). Thinness (low body mass index (BMI) for age) in school aged children can result in delayed maturation, deficiencies in muscular strength and work capacity and reduced bone density later in life\(^1\). Findings from several studies suggested that there is a significant relationship between under nutrition and academic achievement. Undernourished children have

Corresponding author:
Dr Neha Bansal,
Guest Faculty, Department of Home Science,
University of Allahabad, Allahabad.
Email address: nehamanish.bansal@gmail.com

DOI Number: 10.5958/0976-5506.2018.00518.1
been shown to have decreased attendance, attention, and academic performance as well as experience more health problems compared to well nourished children (4,5). Moreover, underweight children were reported to experience more emotional, academic and behavioral problems than well nourished children (6,7,8).

The academic performance of children impacts their future educational attainment and health and has therefore emerged as a public health concern (9). Achievement in school is affected by number of factors, including nutritional status of the child, parent’s educational level and socio economic status. Good academic achievement is directly related to good scoring in various entrance examination and job opportunities therefore always a matter of concern for both parents and students (10). There is converging interest among public health scientists and school policy makers in the health status of adolescents and its impact on their academic achievement (11). The relationship between under nutrition and academic performance is often stated; however, few studies have examined the effect of underweight on academic performance, particularly in older children as most of the existing studies mainly focused on pre-school and primary school children. To our knowledge, relevant study in this area, has not been done in Allahabad. Therefore, the present study was undertaken to find out the relationship between underweight and academic performance in middle school children.

MATERIALS AND METHOD

Study subject: The children belonging to 11-13 years age and studying between 6th to 8th standard from three co educational private schools (Maharshi Patanjali Vidya Mandir, Tagore Public School and Y.M.C.A. Centenary School & College) of Allahabad city were selected for the study.

Procedure: The anthropometric measurements were taken and Body Mass Index (BMI) was calculated. Standard charts for BMI for age and gender were used as reference standards. Children with body mass index above 95th percentile were considered as obese, those between 85th to 95th percentile as overweight and those below 5th percentile were considered as underweight (12). Thirty five identified underweight children as cases and thirty five normal weight children as controls were selected. While selecting controls, it was kept in mind to maintain the similarity of age, gender and income group between case and control. To evaluate the academic achievement of children their Cumulative Grade Point Average (CGPA), Math, English and Science grades were recorded from the school register. Grade were categorized as 9.1-10 = Excellent, 8.1-9 = Very Good, 7.1-8 = Good, 6.1-7 = Average and <6 = Poor.

Statistical Analysis: The collected data was presented in percentages and analyzed by chi square test. p<0.05 was considered significant.

RESULTS AND DISCUSSION

Total number of 909 children in the aged between 11 to 13 years from 6th to 8th standard were studied. Out of them (60.7%) 552 were boys and (39.3%) 357 were girls.

Table1: Nutritional status of children according to BMI for age percentiles (n=909)

<table>
<thead>
<tr>
<th>Nutritional status</th>
<th>Boys (n=552)</th>
<th>Girls (n=357)</th>
<th>Total (n=909)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>17 (3.1%)</td>
<td>17 (4.8%)</td>
<td>34 (3.8%)</td>
</tr>
<tr>
<td>Normal weight</td>
<td>354 (64.1%)</td>
<td>255 (71.2%)</td>
<td>609 (67.0%)</td>
</tr>
<tr>
<td>Overweight</td>
<td>121 (21.9%)</td>
<td>63 (17.6%)</td>
<td>184 (20.2%)</td>
</tr>
<tr>
<td>Obesity</td>
<td>60 (10.9%)</td>
<td>22 (6.2%)</td>
<td>82 (9.0%)</td>
</tr>
</tbody>
</table>

552 (60.7%) 357 (39.3%)

Table 1 depicts the nutritional status of school children. It was found that overall prevalence of overweight, obesity and underweight was 20.2%, 9.0% and 3.8% respectively among middle school children. The proportion of overweight and obesity was found to be higher among boys (21.9% and 10.9%) as compared to girls (17.6% and 6.2%) whereas the proportion of underweight was found higher among girls (4.8%) than boys (3.1%).
Table 2: Comparison of different grades scored by underweight and normal weight children in CGPA, English, Math and Science

<table>
<thead>
<tr>
<th>Category</th>
<th>Excellent (%)</th>
<th>Very Good (%)</th>
<th>Good (%)</th>
<th>Average (%)</th>
<th>Poor (%)</th>
<th>$X^2$</th>
<th>d.f</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CGPA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight children (34)</td>
<td>2 (5.9)</td>
<td>4 (11.7)</td>
<td>13 (38.2)</td>
<td>5 (14.7)</td>
<td>10 (29.4)</td>
<td>3.92</td>
<td>4</td>
<td>0.41</td>
</tr>
<tr>
<td>Normal weight children (34)</td>
<td>3 (8.8)</td>
<td>7 (20.5)</td>
<td>13 (38.2)</td>
<td>7 (20.5)</td>
<td>4 (11.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Math</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight children (34)</td>
<td>2 (5.9)</td>
<td>2 (5.9)</td>
<td>4 (11.7)</td>
<td>7 (20.6)</td>
<td>19 (55.9)</td>
<td>4.48</td>
<td>4</td>
<td>0.35</td>
</tr>
<tr>
<td>Normal weight children (34)</td>
<td>3 (8.8)</td>
<td>5 (14.7)</td>
<td>8 (23.5)</td>
<td>6 (17.6)</td>
<td>12 (35.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>English</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight children (34)</td>
<td>3 (8.8)</td>
<td>12 (35.3)</td>
<td>5 (14.7)</td>
<td>14 (41.2)</td>
<td></td>
<td>5.93</td>
<td>3</td>
<td>0.11</td>
</tr>
<tr>
<td>Normal weight children (34)</td>
<td>-</td>
<td>3 (8.8)</td>
<td>11 (32.4)</td>
<td>13 (38.2)</td>
<td>7 (20.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight children (34)</td>
<td>1 (2.9)</td>
<td>5 (14.7)</td>
<td>3 (8.8)</td>
<td>6 (17.6)</td>
<td>19 (55.9)</td>
<td>0.35</td>
<td>4</td>
<td>0.98</td>
</tr>
<tr>
<td>Normal weight children (34)</td>
<td>1 (2.9)</td>
<td>6 (17.6)</td>
<td>4 (11.7)</td>
<td>5 (14.7)</td>
<td>18 (52.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows the performance of underweight and normal weight children in Cumulative Grade Point Average, Math, English and Science. On comparing the academic achievement of underweight children with normal weight children in CGPA, it was observed that higher proportion of underweight children (29.4%) secured ‘poor’ grade compared to normal weight children (11.7%) whereas lower percentage of underweight children (11.7% and 5.9%) were graded ‘Very good’ and ‘Excellent’ than normal weight children (20.5% and 8.8%) respectively. But, the difference was not found statistically significant (p=0.41).

In Math, higher proportion of normal weight children (23.5%, 14.7% and 8.8%) achieved ‘Good’, ‘Very good’ and ‘Excellent’ grade compared to underweight children (11.7%, 5.9% and 5.9%) respectively whereas larger proportion of underweight children (55.9%) got ‘poor’ grade than normal weight children (35.3%). However, the difference existed between underweight and normal weight children’s performance in math was not found significant (p=0.35). Similarly, in both English and Science subjects it was observed that higher percentage of underweight children (41.2% and 55.9%) obtained ‘poor’ grade compared to normal weight children (20.6% and 52.9%) respectively. Although, the difference was not found statistically significant (p=0.11; p=0.98).

Taken together, the results of the current study reveal that academic achievement of underweight children was lowered compared to normal weight children in all the subjects i.e. Math, English, Science as well as in CGPA. But, the difference was not found significant (p>0.05). However, there are studies that reported a significant relationship between underweight and academic performance. In a study conducted by Abebe et al., (2017) (13) in Hawa Gelan district, Southwest Ethiopia showed that underweight students were less likely (p<0.05) to achieve good academic performance as compared to students having normal weight. Similar findings were found by Golam et al., (2014) (14) among 10-14 years old Bangladeshi school children in Chapainawabganj district, that normal weight children were more likely (p<0.05) to obtain good results than
underweight children. On the other hand study carried out by Borse et al.(2013) reported that 1st year medical college underweight students scored highest compared to normal weight students.

CONCLUSION

In the present study underweight was not found significantly (p>0.05) related to middle school children’s academic achievement. Further studies are required to explore the relation between underweight and academic achievement in children and adolescents.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Not required

REFERENCES


11. Inga Do’ra Sigfu’sdo’ttir,A’lfgeir Logi Kristja’nnsson and John P.Allegrante. Health behavior and academic achievement in Icelandic school children. Health Education Research. 2007;Vol.22 no.1; pages 70-80


A Cost Analysis of Different Brands of Anticonvulsant Drugs Available in India

Ananda Lakshmi¹, B Krishna Prasanth², Sadgunottama Goud Kamparaj¹
¹Assistant Professor, Department of Pharmacology, ²Assistant Professor & Epidemiologist, Department of Community Medicine, Ponnaiyah Ramajayam Institute of Medical Sciences– Manamai, Chennai

ABSTRACT

Introduction: There are wide variations in the cost of different brands of the same generic drugs prescribed. Rational prescribing should also consider the affordability of the medicines particularly for convulsive diseases like epilepsy, which needs treatment for longer period. It is essential to find cost-effective alternative to improve the patient compliance, particularly in developing nations like India.

Aims and objectives: To tabulate and compare the cost/unit (INR) of various brands of anticonvulsant drugs and to find the range of price variations among different brands of the same generic drugs.

Methodology: Different brands of antiepileptic drugs from Current Index Medical Specialties [CIMS] were listed and the cost/unit (INR) of each formulation in various available strengths were tabulated. The minimum cost/unit, maximum cost/unit, price difference and percentage price variations were calculated and analysed.

Results: 30.90% of the listed formulations had more than 100% price variation. Wide percentage price variations (5.88% - 2486.96%) were seen with the first generation antiepileptic drugs (AEDs). The percentage price variation of second generation AEDs (0 – 168.57%) was less than 200% with all the available dosage forms, but the cost per unit of second generation AEDs were higher when compared to that of the first generation AEDs. Inference: The cost of the brand does not directly imply the quality of the drug always. A comparative analysis of costs of different brands of drugs is essential to create awareness regarding the wide price variations seen among the different manufacturers. It will aid the prescriber to choose the most cost-effective medicine. The costs of newer antiepileptic drugs (AEDs) have to be weighed against their benefits (efficacy, safety and quality of life for the patient).

Conclusion: It is the prescribing physician’s responsibility to make an affordable and best choice of drug for the patient based on their clinical needs as well as economic conditions.

Keywords: Antiepileptic, Pharmacoeconomics, CIMS, Brands of drugs, Price variations

INTRODUCTION

“Economic evaluation is a technique by which one identifies, measures, values and compares different alternatives in terms of their costs and consequences”.

Rise in medical care costs is of great concern for patients, clinicians, service providers and policy makers of health care system in the country. The expense of launching drugs into market is enormous. But, the price of certain marketed drugs that were introduced in recent years has exceeded the costs involved in its development, manufacturing and marketing. The growth of pharmaceutical industry in India has been tremendous and there are a huge variety of branded drugs marketed by different manufacturers. There is a large difference in the retail prices of the same formulation marketed by different pharmaceutical firms. This results in misleading decisions while choosing a particular brand of drug. Around 20 million people in India fall below the poverty line each year due to health care expenses and around 50% of total health expenditures are spent on medicines. Pharmacoeconomic research which is still at
infancy stage in India, is essential to ensure that the drug is affordable to all.⁶

Epilepsy is a chronic neurological disorder in which a person has recurrent seizures due to an excessive or abnormal neuronal activity.⁷ Of the 50 million persons with epilepsy world-wide, around 10 million persons are in India.⁸ Antiepileptic drug therapy remains to be the mainstay of treatment for most patients with epilepsy.⁷ The cost of a drug decides practitioner’s prescribing preferences and patient compliance, particularly for drugs used in chronic conditions like epilepsy. Non-adherence to antiepileptic therapy can result in significant morbidity, mortality, and poor quality of life. Healthcare professionals face a big challenge in providing quality medical care at a minimum possible cost.⁹ This study was thus planned to tabulate the costs of various brands and formulations of anticonvulsant drugs listed in Current Index Medical Specialties [CIMS], to find out their cost per unit, and to calculate the percentage price variations among the different listed brands.

**MATERIALS AND METHOD**

CIMS India - 37th Year; April-June 2015 issue was referred for analysis. The retail prices (Indian Rupee - INR) of various brands of drugs used for treatment of epilepsy were tabulated in Microsoft Office Excel 2007. The drugs manufactured by a single manufacturer were excluded. The tabulated data was sorted from highest to lowest prices for each drug (sorted according to formulation and strength) and their difference calculated to find the price variation. The percentage price variation was calculated using the following formula ¹⁰

\[
\text{Percentage Price Variation} = \left( \frac{\text{Price of most expensive brand} - \text{Price of least expensive brand}}{\text{Price of least expensive brand}} \right) \times 100
\]

**RESULTS**

18 anticonvulsant drugs listed in CIMS were taken for cost analysis. 55 different formulations in different strengths [tablets (plain, film coated, enteric coated, sustained release, controlled release, extended release), capsules, syrups, injections] were evaluated for its price variation. 30.90% of the listed formulations had more than 100% price variation. The highest price variation 2486.96% was seen with Inj. Diazepam 10mg (2ml) while the least price variation (0%) was seen with Lacosamide 50 mg tablets. The minimum cost, maximum cost, price variation and percentage price variation of all the available formulations of first and second generation anticonvulsant drugs are listed in Tables 1-3.

Valproic acid [first generation antiepileptic] is the most commonly used first line drug in most types of epilepsy.⁷ Three brands of Valproic acid were available in liquid formulation (200mg/5ml - 100ml bottle). 36.92% price variation was observed. The percentage price variation of valproic acid in tablet form was highest with 200 mg and least with 250 mg. The second generation drugs commonly used as first line therapy are Lamotrigine and Topiramate.⁷ Price variations of greater than 100% were found with Tab. Lamotrigine in all the three available doses (25, 50 and 100mg) while Tab. Topiramate (25, 50 and 100 mg) showed less than 50% price variation, with all the listed brands.

<table>
<thead>
<tr>
<th>DRUG NAME (STRENGTH)</th>
<th>MINIMUM Cost/Unit (INR)</th>
<th>MAXIMUM Cost/Unit (INR)</th>
<th>PRICE VARIATION (INR)</th>
<th>PERCENTAGE VARIATION (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tab. Clonazepam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.25mg</td>
<td>1.00</td>
<td>1.90</td>
<td>0.90</td>
<td>90</td>
</tr>
<tr>
<td>0.5mg</td>
<td>1.00</td>
<td>3.60</td>
<td>2.60</td>
<td>260</td>
</tr>
<tr>
<td>1mg</td>
<td>2.40</td>
<td>4.30</td>
<td>1.90</td>
<td>79.17</td>
</tr>
<tr>
<td>2mg</td>
<td>3.80</td>
<td>6.70</td>
<td>2.90</td>
<td>76.32</td>
</tr>
<tr>
<td>Tab. Clobazam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5mg</td>
<td>2.30</td>
<td>5.35</td>
<td>3.05</td>
<td>132.70</td>
</tr>
<tr>
<td>10mg</td>
<td>4.30</td>
<td>10.64</td>
<td>6.34</td>
<td>147.37</td>
</tr>
<tr>
<td>20mg</td>
<td>11.55</td>
<td>12.47</td>
<td>0.92</td>
<td>7.98</td>
</tr>
<tr>
<td>Tab. Diazepam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2mg</td>
<td>0.50</td>
<td>2.02</td>
<td>1.52</td>
<td>304</td>
</tr>
<tr>
<td>5mg</td>
<td>0.70</td>
<td>3.32</td>
<td>2.62</td>
<td>374.43</td>
</tr>
<tr>
<td>10mg</td>
<td>1.00</td>
<td>4.09</td>
<td>3.09</td>
<td>308.50</td>
</tr>
</tbody>
</table>
Cont... Table 1: Minimum and maximum cost, price variation and percentage variation of oral first generation anticonvulsant drugs

<table>
<thead>
<tr>
<th>DRUG NAME (STRENGTH)</th>
<th>MINIMUM Cost/unit (INR)</th>
<th>MAXIMUM Cost/unit (INR)</th>
<th>PRICE VARIATION (INR)</th>
<th>PERCENTAGE VARIATION (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tab. Gabapentin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100mg</td>
<td>4.30</td>
<td>4.50</td>
<td>0.20</td>
<td>4.65</td>
</tr>
<tr>
<td>300mg</td>
<td>6.99</td>
<td>11</td>
<td>4.01</td>
<td>57.37</td>
</tr>
<tr>
<td>Tab. Lacosamide</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50mg</td>
<td>4.50</td>
<td>4.50</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>100mg</td>
<td>7.80</td>
<td>8.00</td>
<td>0.20</td>
<td>2.56</td>
</tr>
<tr>
<td>Tab. Levetiracetam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250mg</td>
<td>4.40</td>
<td>9.90</td>
<td>5.50</td>
<td>125</td>
</tr>
<tr>
<td>500mg</td>
<td>7.50</td>
<td>17.50</td>
<td>10.00</td>
<td>133.33</td>
</tr>
<tr>
<td>750mg</td>
<td>11.50</td>
<td>24.60</td>
<td>13.10</td>
<td>113.91</td>
</tr>
<tr>
<td>1000mg</td>
<td>14.00</td>
<td>37.60</td>
<td>23.60</td>
<td>168.57</td>
</tr>
<tr>
<td>Syp. Levetiracetam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100mg/ml (100 ml)</td>
<td>280</td>
<td>395</td>
<td>115</td>
<td>41.07</td>
</tr>
<tr>
<td>Tab. Pregabalin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75mg</td>
<td>6.80</td>
<td>9.50</td>
<td>2.70</td>
<td>39.71</td>
</tr>
<tr>
<td>150mg</td>
<td>13.80</td>
<td>14.44</td>
<td>0.64</td>
<td>4.62</td>
</tr>
<tr>
<td>Cap. Pregabalin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75mg</td>
<td>5.49</td>
<td>9.68</td>
<td>4.19</td>
<td>76.25</td>
</tr>
<tr>
<td>150mg</td>
<td>8.23</td>
<td>22.00</td>
<td>13.77</td>
<td>167.29</td>
</tr>
</tbody>
</table>
Cont.. Table 2: Minimum and maximum cost, price variation and percentage variation of oral second generation anticonvulsant drugs

<table>
<thead>
<tr>
<th>DRUG NAME (STRENGTH)</th>
<th>MINIMUM Cost/unit (INR)</th>
<th>MAXIMUM Cost/unit (INR)</th>
<th>PRICE VARIATION (INR)</th>
<th>PERCENTAGE VARIATION (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tab. Oxcarbazepine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150mg</td>
<td>2.64</td>
<td>4.30</td>
<td>1.66</td>
<td>62.94</td>
</tr>
<tr>
<td>300mg</td>
<td>4.83</td>
<td>7.00</td>
<td>2.17</td>
<td>44.84</td>
</tr>
<tr>
<td>600mg</td>
<td>9.00</td>
<td>13.40</td>
<td>4.40</td>
<td>48.89</td>
</tr>
<tr>
<td>Tab. Lamotrigine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 mg</td>
<td>2.00</td>
<td>5.00</td>
<td>3.00</td>
<td>150</td>
</tr>
<tr>
<td>50 mg</td>
<td>3.75</td>
<td>9.00</td>
<td>5.25</td>
<td>140</td>
</tr>
<tr>
<td>100 mg</td>
<td>6.63</td>
<td>15.70</td>
<td>9.08</td>
<td>136.98</td>
</tr>
<tr>
<td>Tab. Topiramate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 mg</td>
<td>3.10</td>
<td>3.30</td>
<td>0.2</td>
<td>6.45</td>
</tr>
<tr>
<td>50 mg</td>
<td>6.00</td>
<td>8.50</td>
<td>2.50</td>
<td>41.67</td>
</tr>
<tr>
<td>100 mg</td>
<td>10.80</td>
<td>14.50</td>
<td>3.70</td>
<td>34.26</td>
</tr>
</tbody>
</table>

INR- Indian Rupees; Tab – Tablet; Cap – Capsule; mg – milligrams; ml - milliliters

Table 3: Minimum and maximum cost, price variation and percentage variation of parenteral anticonvulsant drugs

<table>
<thead>
<tr>
<th>DRUG NAME (STRENGTH)</th>
<th>MINIMUM Cost/unit (INR)</th>
<th>MAXIMUM Cost/unit (INR)</th>
<th>PRICE VARIATION (INR)</th>
<th>PERCENTAGE VARIATION (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inj. Diazepam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10mg/2ml</td>
<td>9.20</td>
<td>238</td>
<td>228.80</td>
<td>2486.96</td>
</tr>
<tr>
<td>Inj. Midazolam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5mg/ml (1ml)</td>
<td>29.20</td>
<td>32.20</td>
<td>3.00</td>
<td>10.27</td>
</tr>
<tr>
<td>1mg/ml (10ml)</td>
<td>52.95</td>
<td>60.40</td>
<td>7.45</td>
<td>14.07</td>
</tr>
<tr>
<td>1mg/ml (5ml)</td>
<td>29.75</td>
<td>33.70</td>
<td>3.95</td>
<td>13.28</td>
</tr>
<tr>
<td>Inj. Phenobarbital</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200mg/ml (1ml)</td>
<td>13.93</td>
<td>24.71</td>
<td>10.78</td>
<td>77.39</td>
</tr>
<tr>
<td>Inj. Phenytoin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50mg/ml (2ml)</td>
<td>10.20</td>
<td>12.09</td>
<td>1.89</td>
<td>18.53</td>
</tr>
</tbody>
</table>

INR- Indian Rupees; Inj – Injection; mg – milligrams; ml - milliliters

DISCUSSION

Economic considerations are very crucial in health care system particularly in developing countries like India. Estimating the costs involved in the treatment is needed to analyse the potential opportunities for reducing the medical expenses and to determine the most effective way of treating a particular disorder.

Epilepsy is one of the most prevalent, chronic and serious neurological disorder worldwide affecting all age groups which can impose a significant economic burden on the society.\(^7,8\) Prevalence is around 1% in Indian population and it is higher in rural areas (1.9%) when compared to the urban areas (0.6%).\(^8\) Epilepsy results in a lower quality of life and lower annual income due to more days of absence from work when compared to other chronic illnesses. Children with epilepsy have lower attendance at school and a poor performance.\(^9,11\) In developing countries, around 90% of the people with epilepsy are not receiving appropriate treatment resulting in a wide treatment gap. This treatment gap is largely attributed to poverty.\(^9,11\) Hence, appropriate and
cost-effective treatment is critical in the management of epilepsy.

In an earlier study by Gupta et al. the cost of different brands of drugs used commonly for epilepsy were analyzed using CIMS, IDR and MIMS. Significant variations were found with first generation AEDs and newer anti-epileptic drugs were costlier than the first generation drugs. The results of our study are comparable with this study. Wide percentage price variations were seen with first generation AEDs (5.88% - 2486.96%). The percentage price variation of second generation AEDs (0 – 168.57%) was less than 200% with all the available dosage forms, but they were costlier when compared to the first generation AEDs. The costs of newer AEDs have to be weighed against their benefits in terms of efficacy, safety and quality of life.

CONCLUSION

Careful and rational selection is needed for drugs when price variation is very high (>200%). Making an affordable choice of drug for the patient is the prescribing physician’s responsibility, particularly for epilepsy which is common and involves prolonged medical management.

Source of Funding - Self

Conflict of Interest - None

Ethical Clearance: This study was duly permitted by the Ethics committee of Sree Mookambika institute of medical sciences (SMIHS/IHEC/2014/A/18).

REFERENCES

Knowledge and Life Style Practices of Individuals with Pre-Hypertension

Keerthi S Nair¹, Bony M Sunny², Sneha M Y²
¹Lecturer, ²IV Year B Sc Nursing, Amrita College of Nursing, Amrita University, Kochi, India

ABSTRACT

Introduction: Pre-hypertension is a forerunner to hypertension and is emerging as an important risk factor of cardiovascular disease. So early identification of the disease in the pre-hypertensive stage assumes significance in prevention of hypertension. A descriptive study was conducted in selected wards of Nayarambalam Grama Panchayath at Ernakulam district in Kerala. Pre-hypertension is systolic pressure from 121 to 139 millimetre of mercury (mm of Hg) and diastolic pressure from 81 to 89 mm of Hg.

Method: Descriptive survey design. The sample identified was 100 individuals with pre hypertension, with assessment checklist and purposive sampling technique. Results: The prevalence of the study finding reveals that, among 151 individuals, 100 (66.6%) were identified as Pre-hypertensive. The overall findings show that majority of sample (76.0%) were having moderate knowledge, and the life style of individual with prehypertension shows that only (53.0%) having good practice. The findings suggest the need to prepare a leaflet that constitute home remedies to improve the life style practices of individuals with prehypertension. An association was found between income of the family and their knowledge, ie those who are having high monthly income had adequate knowledge about Pre-hypertension. Conclusion: The increase in pre hypertension in rural population is a public concern.

Keywords: Life style practices, Pre-hypertension, Individuals with Prehypertension.

INTRODUCTION

Pre hypertension is a condition where a person’s blood pressure is elevated above normal but not to the level considered to be hypertension (high blood pressure). The reference range of pre-hypertension is systolic BP 121-139 mm of Hg and diastolic BP 81-89 mm of Hg. Elevated blood pressure develops gradually over many years usually without a specific identifiable cause. A primary risk factor for Pre-hypertension is being overweight. Other risk factors include a family history of hypertension, a sedentary lifestyle, eating high sodium foods, smoking, and excessive alcohol intake. Blood pressure levels appear to be familial, but there is no clear genetic pattern. Preventive and public health interventions need to be implemented to reduce the prevalence of raised blood pressure. It is reasonable to monitor BP more closely in pre hypertensive subjects since a significant proportion of them will later develop hypertension¹. To lower the risk of pre hypertension progressing to hypertension, modification of lifestyle or behaviours is necessary. A low-fat, low-sodium, high potassium diet (e.g. DASH diet) is recommended, along with increasing physical activity to at least thirty minutes a day most days of the week, quitting smoking, limiting alcohol, and maintaining a healthy weight. Careful monitoring for signs of end-organ damage or progression to hypertension is an important part of the follow-up of patients with prehypertension. The challenging task will require a complex combination of health behaviours, including reduction in calorie intake, and decrease sedentary activities.

A study was conducted regarding the Prevalence and risk factors for prehypertension and hypertension in five Indian cities. In the present study, Men and women, over 25 years of age were included. After completion of a dietitian-administered questionnaire followed...
evaluation by a physician, physical examination and blood pressure measurement. Cross-sectional survey screened 6940 subjects. The results of the study showed that Prevalence of prehypertension and hypertension, was significantly greater in South India (Trivandrum: W 31.5; 31.9%; M 35.1; 35.5%) and West India (Mumbai: W 30.0; 29.1%; M 34.7; 35.6%) compared to North India (Moradabad: W 24.6; 24.5%; M 26.7; 27.0%) and East India (Kolkata: W 20.9; 22.4%; M 23.5; 24.0%). Subjects with pre-hypertension and hypertension were older, had a higher BMI, central obesity and a sedentary lifestyle. They had a higher salt and alcohol intake, with greater oral contraceptive usage (W). In the present study there was little awareness that, pre-hypertension and hypertension are public health issues in India. However, it is asserted that lifestyle modification should be pursued over pharmacological intervention unless a secondary disease is present (eg, type 2 diabetes mellitus or kidney disease). Lifestyle modification is the cornerstone of management in all patients with pre-hypertension.

BACKGROUND OF THE STUDY

The prevalence of pre-hypertension in our study is comparable with other studies elsewhere in both low and high income countries. A study was conducted to assess the prevalence of pre-hypertension and its relationship to risk factors for cardiovascular disease in Jamaica. The results of the study proves that, prevalence estimates reported range was 31% in the United States, 31.6% in Korea, 34% in Taiwan, 35% in Jamaica, 40% in the Ashanti region of Ghana to 47% in Liaoning Province in China and 48.9% among the military in Israel.

India is experiencing a rapid health transition, within India the state of Kerala is the most advanced in this transition heavily influenced by western living pattern including sedentary lifestyle with high cardiovascular (CVD) risk profile. In India pre-hypertension was 32.3%, pre-hypertension was highest (36%) in the age group of 30 to 39 associated with there was high prevalence of cardiovascular risk factors in general population. Central obesity (86.7%) elevated LDL cholesterol (22.8%) abnormal glucose tolerance (41.6%) and smoking (20.3% of males).

The prevalence and determinants of pre-hypertension and hypertension among adolescents from high schools in a rural area of Kerala, a cross sectional analytical study was carried out in 1000 adolescents from randomly selected Government, Aided and Unaided high schools of Ettumanoor, Kerala proportionate to sampling frame using WHO designed Global School based student Health Survey (GSHS) questionnaire. In Kerala out of 1000 study subjects, 409 (40.9%) were males and 591(59.1%) were females. Overall prevalence of pre-hypertension was 24.5% (males 30.5%, females 20.3%) and 0.6 % (males 0.98%, females 0.34%) respectively. Understanding determinants of pre-hypertension especially in low income countries is a pre-requisite for improved prevention and control.

MATERIALS AND METHOD

Research methodology

The present study was aimed to assess the knowledge and lifestyle practices of individuals with prehypertension in selected wards of Nayarambalam Grama Panchayath at Ernakulam District.

Setting of the study

The location for conducting research is referred to as the setting. The study was conducted in Nayarambalam Grama Panchayath at Ernakulam District (11,12&13wards). It is an area covering 25000 population, and is divided in to 15 wards. Each ward covers around 1600 population .From these wards, 3 wards were selected for the study. The names of the wards are as follows Veliyathamparambu,Kudugassery,Beach road .

Population

The population selected for this study is individuals with pre hypertension.

Sample and Sampling Technique

The researcher were finally chosen 100 people as individuals with pre-hypertension from 150 home visit in Nayarambalam Grama Panchayath .Sampling technique used for the study was purposive sampling.

Sampling criteria

Inclusion criteria

In the present study inclusion criteria which includes pre-hypertensive individuals:-

who were willing to participate in the study
Exclusion criteria

Exclusion criteria in the present study includes,

People with hypertension
Pregnant women

Tool / Instrument

Development/selection of tool

The tool used in the present study consists of

Assessment checklist prepared by the investigator based on American heart association to be used for pre-hypertension.

Structured knowledge questionnaire developed by the researcher, which focuses on all areas of pre-hypertension.

Rating scale to assess the life style practices of individuals with pre-hypertension.

Description of the tool

Tool developed by the investigator are

Tool 1: Assessment checklist for identifying the people with pre-hypertension.

Assessment checklist is based on the American Heart Association criteria for pre-hypertension. As per the checklist the person who has BP =121/81 to 139/89 and with any one of the following criteria such as BMI >= 30 kg/m², Age = 20-35, Family history of pre-hypertension or heart disease, history of dyslipidemia and sedentary workers

Tool 2: Structured questionnaire

Part 1: Socio demographic data.

Socio Demographic Data consists of age, gender, dietary pattern and socio economic status based on Kuppuswamy scale.

Part II: A structured questionnaire

To assess the knowledge questions related to disease aspect, diet, exercise, health check up, and lifestyle. There were 14 questions prepared as multiple choice. The correct responses are awarded with score 1 and in correct responses are awarded with score zero. The maximum score was 14.

Tool 3: Rating scale

Rating scale was to assess the life style practices of individuals with pre-hypertension. It consists of questions related to diet, exercise, health check up, and lifestyle. The respondent has to select the most appropriate option and place a tick mark against it. The maximum score for each positive statement was 4 and the minimum was 1.

Data collection procedure

Pilot study was to find out the feasibility of the study, clarity in the tool and to finalize the plan for analysis. After obtaining permission from president of Nayarambalam Grama panchayath, the pilot study was conducted at 10th ward of the Nayarambalam Grama panchayath on 07-01-2017 to find the feasibility of the study.

Sample was identified with the assessment checklist using purposive sampling technique. The sample screened for pilot study was 10 among 23 individuals. Findings of the pilot study were 90% people having moderate knowledge and 10% people having inadequate knowledge about pre-hypertension and the practice were good.

Content validity: It gets from five nursing assistant professors and HOD of community medicine in Amrita College of nursing.

Reliability: Tool reliability screened by statistics department of Amrita College of nursing. The reliability of the tool was found to be 0.7. The tool was confirmed to be reliable.

The study was conducted after getting permission from the president of the Nayarambalam Grama Panchayath at Ernakulam District. The data collection period was from 7/1/2017 and completed on 24/01/2017. Based on the assessment checklist, 100 were identified as pre-hypertensive from 150 home visit and was selected for the study. The questionnaire was completed within 30 minutes and the doubts were clarified after the session and provided leaflets to each individual. It was a wonderful experience for the investigator to mingle with the public.

Plan for data analysis

The data obtained was planned to be analyzed by
descriptive and inferential statistics on the basis of objectives and hypothesis of the study. The data was presented by tables and graphs.

Prevalence was analysed by using frequencies and percentage.

Knowledge and lifestyle practices was analysed by using frequencies and percentage

Association between knowledge and life style practices was analysed by using chi -square test

Association between knowledge and demographic variable was analysed by using chi square test.

Association between lifestyle practices and selected demographic variable was analysed by using chi square test.

Ethical Consideration

Research proposal was presented before research committee of Amrita college of Nursing on 30-08-2016 for obtaining approval. The same research proposal sent to research review committee of Amrita Institute of Medical Science and received the approval to conduct the study in the present settings. Informed consent had taken from the sample before conducting the study.

FINDINGS

The findings has been organized and presented under the following headings.

Assess the prevalence of pre-hypertension in Nayarambalam Grama Panchayath.

The wards were selected based on purposive sampling method, among 16 wards only 3 wards were selected based on purposive sampling method.

Table 1: Distribution of subject based on prevalence of individuals with pre-hypertension

<table>
<thead>
<tr>
<th>Ward No</th>
<th>Ward Name</th>
<th>Screened people</th>
<th>Sample Identified</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.</td>
<td>Veliyathamparambu</td>
<td>62</td>
<td>58</td>
<td>38.4%</td>
</tr>
<tr>
<td>112.</td>
<td>Kudugassery</td>
<td>51</td>
<td>30</td>
<td>19.8%</td>
</tr>
<tr>
<td>113.</td>
<td>Beach road</td>
<td>38</td>
<td>12</td>
<td>7.9%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>151</td>
<td>100</td>
<td>66.1%</td>
</tr>
</tbody>
</table>

Data presented in table 1, depict sample identified from different wards of Nayarambalam Grama Panchayath. The data shows that 58 (38.4%) of the study subjects in veliyathamparambu, 30 (19.8%) in Kudugassery, 12 (7.9%) in beach road were pre-hypertensive. The data from different wards shows that, there was high prevalence of pre-hypertension, which is 100 (66.1%) in Nayarambalam Grama Panchayath.

2. Determination of the knowledge of individuals with pre-hypertension

Table 2: Percentage distribution of subject based on their knowledge level

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>76</td>
<td>76.0</td>
</tr>
<tr>
<td>Adequate</td>
<td>23</td>
<td>23.0</td>
</tr>
</tbody>
</table>

Data presented in table 2, depict the knowledge of individuals with pre hypertension in different wards of Nayarambalam Grama Panchayath. The data shows that 76% were having moderate knowledge and the 23% were adequate knowledge and the remaining 1% having inadequate practice. So the present study reveals that the subject level of knowledge is moderate (76%).

3. Assesss the lifestyle practices of individuals with pre-hypertension

Table 3: Percentage distribution of subject according to their life style practices

<table>
<thead>
<tr>
<th>Rating Scale</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>47</td>
<td>47.0</td>
</tr>
<tr>
<td>Good</td>
<td>53</td>
<td>53.0</td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Data presented in table 3, depict the lifestyle practices of individuals with pre hypertension in different wards of Nayarambalam Grama Panchayath. The data shows that 47% were having moderate life style practices and the remaining 53% were having good practice. So the present study reveals that higher percentage were having good lifestyle practices which is (53%).
4. Find out the association between knowledge and lifestyle practices.

There is no significant association between knowledge and lifestyle practice at 0.05 level of significance \( (p=0.05) \).

5. Find out the association between knowledge and selected demographic variables.

There is significant association between the knowledge and income (Table 4). No significant association was found between knowledge and all other variables such as age, sex, caste, diet, occupation and education at 0.05 level of significance.

Table 4: Association between knowledge and selected demographic variables.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Category</th>
<th>Knowledge Inadequate Moderate + Adequate</th>
<th>( \chi^2 ) Value</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male (15)</td>
<td>N</td>
<td>11</td>
<td>73.3</td>
</tr>
<tr>
<td></td>
<td>Female (85)</td>
<td>N</td>
<td>66</td>
<td>77.6</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Married(94)</td>
<td>N</td>
<td>71</td>
<td>75.5</td>
</tr>
<tr>
<td></td>
<td>Unmarried &amp; Widow(6)</td>
<td>N</td>
<td>6</td>
<td>100.0</td>
</tr>
<tr>
<td>Education</td>
<td>SSLC(73)</td>
<td>N</td>
<td>56</td>
<td>76.7</td>
</tr>
<tr>
<td></td>
<td>Above SSLC(27)</td>
<td>N</td>
<td>21</td>
<td>77.8</td>
</tr>
<tr>
<td>Job status</td>
<td>Unemployed(51)</td>
<td>N</td>
<td>40</td>
<td>78.4</td>
</tr>
<tr>
<td></td>
<td>Employed(49)</td>
<td>N</td>
<td>37</td>
<td>75.5</td>
</tr>
<tr>
<td>Income</td>
<td>Below 2227(73)</td>
<td>N</td>
<td>61</td>
<td>83.6</td>
</tr>
<tr>
<td></td>
<td>Above 2227(27)</td>
<td>N</td>
<td>16</td>
<td>59.3</td>
</tr>
</tbody>
</table>

The chi square value for income \( (\chi^2 =6.6 ) \) was equal to the table value (6.64) at 0.01 level of significance \( (p=0.01) \).

5. Find out the association between lifestyle practices and selected demographic variable

Table 5: Association between lifestyle practices and selected demographic variable

<table>
<thead>
<tr>
<th>Variables</th>
<th>Category</th>
<th>Rating Scale</th>
<th>( \chi^2 ) Value</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male (15)</td>
<td>N</td>
<td>10</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td>Female (85)</td>
<td>N</td>
<td>37</td>
<td>43.5</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Married(94)</td>
<td>N</td>
<td>45</td>
<td>47.9</td>
</tr>
<tr>
<td></td>
<td>Unmarried and widow(6)</td>
<td>N</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>Education</td>
<td>SSLC(73)</td>
<td>N</td>
<td>34</td>
<td>46.6</td>
</tr>
<tr>
<td></td>
<td>Above SSLC(27)</td>
<td>N</td>
<td>13</td>
<td>48.1</td>
</tr>
<tr>
<td>Job status</td>
<td>Unemployed(51)</td>
<td>N</td>
<td>23</td>
<td>45.1</td>
</tr>
<tr>
<td></td>
<td>Employed(49)</td>
<td>N</td>
<td>24</td>
<td>49.0</td>
</tr>
<tr>
<td>Income</td>
<td>Below 2227</td>
<td>N</td>
<td>34</td>
<td>46.6</td>
</tr>
<tr>
<td></td>
<td>Above 2227</td>
<td>N</td>
<td>13</td>
<td>48.1</td>
</tr>
</tbody>
</table>
There is no significant association between knowledge and lifestyle practice at 0.05 level of significance (p=0.05).

**DISCUSSION**

A disorder that has no apparent symptoms but later results in serious health problems can pose great threat to the health of people. NCDs have common risk factors such as tobacco use, unhealthy diet, physical inactivity and excess adiposity. The prevalence of cardiovascular diseases and hypertension is rapidly increasing in developing countries, this increase, most marked in the urban population, is likely to be related to changing lifestyles and to an increased longevity.

**Primary objective was to assess the prevalence of individuals with pre-hypertension**

The result of the study shows that high prevalence (66.1%) for pre-hypertension in Nayarambalam Grama Panchayath. According to a cross-sectional analytical study was carried out by Geethadevi Madhavikutty Amma, Bindhu Vasudevan, Sobha Akshayakumar et al in their study, Prevalence and determinants of pre-hypertension and hypertension in 2015 among 1000 adolescents in high schools, Ettumanoor. The findings was Male sex, Low socio-economic status, obesity/overweight, low fruit and high soft drink consumption are the significant determinants of pre-hypertension and hypertension among adolescents.

According to a journal article by Vinod R. Wasnik, Ajay K. Jawarkar suggests that, there is a critical need for innovative prevention programs targeting families at risk for pre-hypertension.

**CONCLUSION**

Pre-hypertension was more common in men when compared to women. The results of this study provide an insight into the prevalence of pre-hypertension among adolescents. The high prevalence of pre-hypertension necessitates urgent intervention in order to improve the individuals knowledge and lifestyle practices including dietary practices, home remedies, and exercises.

**Conflict of Interest**: There is no conflict of interest between the authors.

**Source of Funding**: Self

**REFERENCES**

9. Geethadevi, Madavikuttyamma, Prevalence and determinants of pre-hypertension and hypertension

A Study of Self-Perceived Need for Management Training among Interns at a Government Medical College in Karnataka

Manjunatha S N¹, Chandrakumar S G¹, Revathi Devi ML¹, Shekar MA³, Krishna Murthy⁴, Prashantha B⁵

¹Associate Professor, Department of Community Medicine, ²Professor & Head, Department of Physiology, ³Dean and Director, Mysore Medical College & Research Institute, Mysore, ⁴Director, Karnataka Institute of Endocrinology, Bengaluru, ⁵Assistant Professor, Department of Community Medicine, Mysore Medical College & Research Institute, Mysore

ABSTRACT

Introduction: A professional training that is based upon an individualistic orientation does not prepare physicians to function successfully as members of large and complex organisations. The general observation that qualitative leadership in the healthcare industry lags behind that in other industries by about 10–15 years.

Objectives: To assess the self-perceived need for management training among interns.

To study the preferred format for educational intervention among medical students in fostering the management related competencies.

Materials and Method: This Cross-Sectional study was done at Mysore Medical College, Mysore with the data obtained from 2 batch of Interns, using pre-tested questionnaires and 7 point likert scale. SPSS 19 was used. Descriptive statistics, Pearson’s correlation coefficient was used.

Results: Majority of the Interns have Post graduation as their career preference. Knowledge Gap is maximum regarding medical records and hospital budgeting and least regarding communication need within a team. Career Preferences had an impact on the management need training among medical students. Most of them opine that training should start from first professional itself and it should be theory, hospital and practical based.

Keywords: management need, knowledge gap, leadership

INTRODUCTION

“Leadership means getting along with people”- MK Gandhi. To practice medicine is to serve in the capacity of leader or team member on multiple teams simultaneously at any given time. A professional training that is based upon an individualistic orientation does not prepare physicians to function successfully as members of large and complex organisations¹.

Clinician who understands and provides preventive, promotive, curative, palliative and holistic care with compassion.

• Leader and member of the health care team and system with capabilities to collect analyse, synthesize and communicate health data appropriately.

• Communicator with patients, families, colleagues and community.

• Lifelong learner committed to continuous improvement of skills and knowledge.

• Professional, who is committed to excellence, is ethical, responsive and accountable to
patients, community and profession.\textsuperscript{2}

THE EMERGENCE of the FIVE-STAR DOCTOR\textsuperscript{3}

* Care provider
* Decision-maker
* Communicator
* Community leader
* Manager

The general observation that qualitative leadership in the healthcare industry lags behind that in other industries by about 10–15 years\textsuperscript{4}.

The question

• Is management training an ‘unmet need’ of medical students?

Objectives

• To assess the self-perceived need for management training among interns.

• To study the preferred format for educational intervention among medical students in fostering the management related competencies.

METHOD

This Cross Sectional Study was done at mysore medical college and research institute, Mysore, Karnataka and data was obtained by 2 batch of interns during the year 2015-16. A total of 207 medical interns were participated in the study. Informed consent was taken before administering Pre tested questionnaire, 7 point likert scale. Ethical Clearance was taken from Institutional ethical committee. Data was analysed using SPSS 19 and Descriptive statistics, Pearson’s correlation coefficient were used.

Study variables

• Perceived knowledge gap in 10 selected management skills career interests of interns

• Preferred types of educational interventions in management and the stage at which these should take place in their training

Selected management skills for the study:

• Communication in teams
• Communication with patients
• Inventory management
• Time management
• Hospital and program planning
• Hospital budgeting
• National health programmes
• Management of legal issues in health care
• Management of safety and quality
• Medical records

RESULTS

Table 1: Career Preferences

<table>
<thead>
<tr>
<th>Career preferences</th>
<th>Number (N=207)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Service</td>
<td>17</td>
<td>8.2%</td>
</tr>
<tr>
<td>General practice in urban area</td>
<td>09</td>
<td>4.3%</td>
</tr>
<tr>
<td>Post graduation</td>
<td>176</td>
<td>85%</td>
</tr>
<tr>
<td>Undecided</td>
<td>05</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

Majority of the MBBS Graduates prefer post-graduation as their career.

Table 2: Perceived Level of Knowledge and Importance regarding Leadership

<table>
<thead>
<tr>
<th>Knowledge domain</th>
<th>Perceived level of knowledge Mean score SD</th>
<th>Perceived level of importance Mean Score SD</th>
<th>Knowledge/importance Gap Mean score SD</th>
<th>Gap%</th>
</tr>
</thead>
<tbody>
<tr>
<td>communication in teams</td>
<td>5.2 1.7</td>
<td>6.1 1.8</td>
<td>1.0 1.1</td>
<td>14.9</td>
</tr>
<tr>
<td>communication with patients</td>
<td>4.8 1.9</td>
<td>6.3 1.8</td>
<td>1.5 1.5</td>
<td>22.0</td>
</tr>
<tr>
<td>Inventory management</td>
<td>3.6 1.3</td>
<td>5.9 1.4</td>
<td>2.3 1.9</td>
<td>32.7</td>
</tr>
</tbody>
</table>
**Table 2: Perceived Level of Knowledge and Importance regarding Leadership**

<table>
<thead>
<tr>
<th>Selected parameters to the knowledge gap</th>
<th>Pearson Correlation</th>
<th>Significance (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time management</td>
<td>3.5 1.7</td>
<td>6.1 1.8 2.6 1.8 37.3</td>
</tr>
<tr>
<td>Hospital and program planning</td>
<td>3.3 1.6</td>
<td>5.1 1.8 1.9 1.8 26.6</td>
</tr>
<tr>
<td>Hospital budgeting</td>
<td>2.8 1.2</td>
<td>5.4 1.2 2.6 1.8 37.0</td>
</tr>
<tr>
<td>National health programmes</td>
<td>2.8 1.5</td>
<td>4.3 1.7 1.5 1.7 21.1</td>
</tr>
<tr>
<td>Management of legal issues in health care</td>
<td>2.8 1.5</td>
<td>5.2 1.4 2.4 2.0 33.9</td>
</tr>
<tr>
<td>Management of safety and quality</td>
<td>2.7 1.5</td>
<td>4.9 2.0 2.1 2.0 30.4</td>
</tr>
<tr>
<td>Medical records</td>
<td>2.2 1.3</td>
<td>5.5 1.8 3.3 1.8 47.0</td>
</tr>
</tbody>
</table>

As depicted in table 2, Maximum Knowledge gap exists regarding medical records and hospital budgeting and least regarding communication within team.

**Table 3: Correlation between perceived knowledge gap and career related variables**

<table>
<thead>
<tr>
<th>Selected parameters to the knowledge gap</th>
<th>Pearson Correlation</th>
<th>Significance (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefers to work in private clinic</td>
<td>0.259**</td>
<td>0.009</td>
</tr>
<tr>
<td>Advanced degree of studies</td>
<td>-0.269**</td>
<td>0.006</td>
</tr>
<tr>
<td>Higher level of self-reported personal leadership trait</td>
<td>0.127</td>
<td>0.207</td>
</tr>
<tr>
<td>Higher degree of perceived competition in profession</td>
<td>0.252*</td>
<td>0.011</td>
</tr>
</tbody>
</table>

Table 3 shows students who have career aspirations of advanced studies had negative correlation with the knowledge gap and all other career options shows positive correlation.

**Table 4: Timing of management training during MBBS course**

<table>
<thead>
<tr>
<th>Timing of training</th>
<th>Number (N=207)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Should be started from first professional</td>
<td>108</td>
<td>52%</td>
</tr>
<tr>
<td>Should be started from Second professional</td>
<td>29</td>
<td>14%</td>
</tr>
<tr>
<td>Should be started from final year</td>
<td>07</td>
<td>4%</td>
</tr>
<tr>
<td>Should be given during Internship</td>
<td>30</td>
<td>13%</td>
</tr>
<tr>
<td>Undecided</td>
<td>33</td>
<td>16%</td>
</tr>
</tbody>
</table>

More than half of the people opine that management training should start from the first professional itself (Table 4).
Table 5: Format of management training during MBBS course

<table>
<thead>
<tr>
<th>Format of training</th>
<th>Number (N=207)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory is enough</td>
<td>13</td>
<td>6%</td>
</tr>
<tr>
<td>Theory and practical</td>
<td>19</td>
<td>9.5%</td>
</tr>
<tr>
<td>Theory, practical and hospital based (bedside + hospital administration)</td>
<td>158</td>
<td>76%</td>
</tr>
<tr>
<td>Undecided</td>
<td>17</td>
<td>8.5%</td>
</tr>
</tbody>
</table>

Nearly three fourths opine that format of training should be theory, practical and hospital based.

Table 6: Assessment of management skills during MBBS course

<table>
<thead>
<tr>
<th>Perceived need for assessment</th>
<th>Number (N=207)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects and assignments only</td>
<td>167</td>
<td>80.6%</td>
</tr>
<tr>
<td>University and internals</td>
<td>40</td>
<td>19.4%</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Curriculum planners need to be flexible if they are to successfully incorporate leadership and management training. It may be more effective and efficient to help students relate ongoing educational activities with relevant leadership and management education rather than running an isolated leadership and management course. In this regard, it may first be necessary to win the hearts and minds of clinicians with whom students come into contact in order that they can act as positive role models for the importance of leadership and management in improving patient care and assist students develop their competences as they develop their clinical expertise. Due to the difficulty in differentiating management related to organisations and management related to patient care, we used a very inclusive search strategy, which yielded a large number of titles. However this strategy also resulted in consideration of material not specifically generated for healthcare audiences. The healthcare sector may benefit from looking at other sectors.

There is a growing acknowledgement that doctors need to develop leadership and management competences to become more actively involved in the planning, delivery and transformation of patient services. The results pertaining to the attitudes of students to provide evidence to inform curriculum development in this developing field of medical education. Quality Improvement; Managed Care, Use of Resources and Costs; General Leadership and Management; Role of the Doctor, and Patient Safety were all important factors to be considered by doctors. Students have positive attitudes to clinical practice guidelines, quality improvement techniques and multidisciplinary teamwork, but mixed attitudes to managed care, cost containment and medical error. Medical students perceive a need for leadership and management education but identified lack of curriculum time and disinterest in some activities as potential barriers to implementation. However, students recognise a need to develop leadership and management competences. Although further work needs to be undertaken, using rigorous methods, to identify the most effective and cost-effective curriculum innovations, this review offers the only currently available summary of work examining the attitudes of students to this important area of development for future doctors.

**CONCLUSION**

Medical students have mixed attitudes to aspects of leadership and management, and education interventions had variable effects on students’ attitudes. Although further work needs to be undertaken, using rigorous methods, to identify the most effective and cost-effective
curriculum innovations to enable medical students to develop relevant skills to achieve service delivery and improvement, there is a growing acknowledgement that doctors need increasingly to develop leadership and management competences. Record keeping, handling legal issues, hospital budgeting, quality & safety management and time management are perceived as lacking. Management skills training is an ‘unmet need’ of the MBBS students. Early exposure, integrated teaching and inclusion in assessment is needed.

Limitation

• Subjective element is dominant.
• Only Interns are included.

Implications

• Management skills will help doctors to prevent and manage most of the ‘conflicts’ arising in day to day clinical care.
• Efficiency and effectiveness of the system increases.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: was taken from the institutional ethical committee.

REFERENCES

2. Indian Medical Graduate (IMG) according MCI revised GME rules 2012:
6. Attitudes of medical students to medical leadership and management: a systematic review to inform curriculum development „Mark R Abbas”, Thelma A Quince, Diana F Wood and John A Benson
A Correlational Study on Assertiveness and Self Esteem of Undergraduate Students of a Selected College of Nursing, Ernakulam

Sreedevi P A¹, Aswathy B L², Neethumol Roy²

¹M. Sc in Psychiatric Nursing, Professor, Head of the Department of Mental Health Nursing, Amrita College Nursing, AMRITA Viswa Vidyapeetham, Health Care Campus, Kochi, ²Fourth Year B.Sc. Nursing, Amrita College of Nursing, AMRITA Viswa Vidyapeetham, Health Care Campus, Kochi

ABSTRACT

Objectives: The study was designed to identify the levels of assertiveness and self esteem of undergraduate nursing students and to correlate these two variables. Materials and Method: This descriptive study was conducted after the ethical procedures, among a randomly recruited sample of 120 B. Sc. Nursing students (30 each from 1st to 4th year) of a selected College of Nursing. Data were collected using Personal information schedule, and two standardised self-report tools, the Rathus Assertiveness Schedule and Rosenberg Self-esteem scale. Results: The sample mean of assertiveness was 9.29 (SD. 20.89) and that of the self-esteem was 21.07 (SD. 3.36). Only 26.7% of the nursing students were found to be assertive. Eighty five percentage of the sample had average self esteem. No correlation was observed between assertiveness and self-esteem of students. There was statistically significant association between assertiveness and the year of study, medium of instruction before joining nursing, participation in extra curricular activities and percentage of marks obtained in plus two examination. Self esteem was associated with students who rated themselves as introverts.

Conclusion: Based on the study findings, the researchers suggest to include assertiveness training mandatory in the undergraduate nursing education programme.

Keywords: Assertiveness, Self-esteem, Nursing students

INTRODUCTION

The nursing role is rapidly evolving as nurses are tasked with an even wider range of health care responsibilities. Today’s nurses are not just caring for the sick. They are collaborating with their colleagues, from social workers and oncologists to hospital administrators and public safety personnel. The field is growing, and so are opportunities for nurse practitioners, DNP and PhD nurses, nurse educators, nurse-anaesthetists, and nurse researchers¹. Nurses need to be highly assertive in order to manage the challenges in the current health care environment and in the complex human relations situations. Assertiveness is the quality of being self-assured and confident without being aggressive. It is the ability to express one’s feelings, opinions, beliefs, and needs directly, openly and honestly, while not violating the personal rights of others².

An assertive person will not sacrifice his own wants and needs just to please others. This is because he is usually a self-confident person with a high self-esteem. Assertive nurses are able to present suggestions in a direct, comfortable way, give and take criticism, assess the rights and responsibilities in a nursing situation, and act on assessments in a thoughtful problem-solving way³. Literature strongly suggests the importance of assertiveness in the field of nursing. Being assertive
reduces stress. Problem solving skills are more in assertive nurses. Nurses’ ability to be assertive is key in reducing risk, preventing major medical errors, effective nurse-patient communication and improving patient care. Studies have found an inverse relationship between assertiveness and depression in nursing students. Assertiveness is important for a healthy self-esteem also. Studies have shown a positive relationship between self-esteem and assertive personality trait.

Self-esteem can be defined as an individual’s perception of feeling worthy and satisfaction with themselves. It is one of the most important factors affecting mental health. Self-esteem is a major predictor of behaviour, also it depends on various factors like self perception of body image. Self esteem can be a mediating factor for building an affective commitment in the employees and studies have reported negative correlations between affective commitment and turnover intentions of employees. Nurses with healthy self-esteem are likely to deliver therapeutic patient care, while those with low self-esteem are less likely to do so. Self-esteem is widely recognized as a central aspect of psychological functioning during adolescence. It plays a significant role in the development of a variety of mental disorders. Literature shows clear inverse association between self-esteem and emotional states, symptoms of depression, anxiety and eating problems.

Today’s nursing students are tomorrow’s professional nurses. Passiveness can become a problem for them when building a relationship, going out in the career world or communicating with patients, patients’ family members, superiors and co-workers. Developing assertiveness may help the student to develop the communication skills, to feel self-confident, to increase self-esteem, to gain the respect of others and to improve the decision-making ability, all these are essential for leading a professional life. In order to ensure competent and safe practice, it is necessary for them to be individuals with high self-esteem and assertive skills and these must be inculcated in them through their nursing education programs. This correlational study on assertiveness and self esteem among undergraduate students of a selected College of Nursing, Ernakulam was done with the following objectives.

1. To identify the levels of assertiveness and self esteem of undergraduate nursing students.
2. To correlate assertiveness and self esteem
3. To find out the association between selected socio demographic variables and assertiveness and self esteem.

MATERIALS AND METHOD

Study design, sample and setting

This cross-sectional study has a descriptive design. The sample consisted of randomly recruited 120 undergraduate nursing students of Amrita College of Nursing. From first to forth year classes (75 students in each class), 30 students from each class were selected randomly using random table. Ethical procedures were completed before data collection.

Instruments

1. Personal information schedule

2. Rathus Assertiveness scale (Spencer A Rathus). This is a standardized 30-item self-report six point Likert scale. The total score ranges between -90 and +90 and is interpreted as the following.

   -90 to -20 Very non-assertive
   -20 to 0 Situationally non-assertive
   0 to +20 Somewhat assertive
   +20 to +40 Assertive, and
   +40 to +90 Probably aggressive.

   Rathus assertiveness schedule is shown to have moderate to high test-retest reliability (r=.78) and split-half reliability (r=.77).

3. Rosenberg Self esteem scale (Rosenberg (1965))
It is a widely used standardized self report instrument containing 10 items for evaluating individual’s self esteem. All items are answered using a 4-point Likert scale format ranging from strongly agree to strongly disagree. The interpretation is as 26-30-high self esteem, 15-25 -average and <15- low self esteem. The scale is found to have high reliability, alpha coefficient, 0.85.

Data analysis- The data was analysed by SPSS version 21 and appropriate descriptive and inferential statistics were employed.

RESULTS

Section I. Socio-demographic characteristics of the subjects

Table 1: Distribution of subjects based on personal variables. \( n = 120 \)

<table>
<thead>
<tr>
<th>Personal variables</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age [in years]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>26</td>
<td>21.7</td>
</tr>
<tr>
<td>19</td>
<td>31</td>
<td>25.8</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
<td>25.0</td>
</tr>
<tr>
<td>21</td>
<td>33</td>
<td>27.5</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Female</td>
<td>118</td>
<td>98.3</td>
</tr>
<tr>
<td>Father’s education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 10th standard.</td>
<td>39</td>
<td>32.5</td>
</tr>
<tr>
<td>Pre degree/diploma</td>
<td>45</td>
<td>37.5</td>
</tr>
<tr>
<td>Degree/post graduation</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
<td>Mother’s education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 10th standard.</td>
<td>21</td>
<td>17.5</td>
</tr>
<tr>
<td>Pre degree/diploma</td>
<td>55</td>
<td>45.8</td>
</tr>
<tr>
<td>Degree/post graduation</td>
<td>44</td>
<td>36.6</td>
</tr>
<tr>
<td>Participate extra-curricular activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>109</td>
<td>90.8</td>
</tr>
<tr>
<td>No</td>
<td>11</td>
<td>9.2</td>
</tr>
<tr>
<td>You rate yourself as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introvert</td>
<td>54</td>
<td>45.0</td>
</tr>
<tr>
<td>Extrovert</td>
<td>66</td>
<td>55.0</td>
</tr>
<tr>
<td>Plus two marks (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 70</td>
<td>13</td>
<td>10.8</td>
</tr>
<tr>
<td>71-80</td>
<td>50</td>
<td>41.7</td>
</tr>
<tr>
<td>81-90</td>
<td>51</td>
<td>42.5</td>
</tr>
<tr>
<td>91-100</td>
<td>6</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Table:1 shows that majority (90.8%), used to participate in extracurricular activities and more than half of them rated themselves as extroverts.
Section. II. A. Assertiveness and self-esteem of undergraduate nursing students

Table: 2. Mean and standard deviation of assertiveness and self-esteem of undergraduate nursing students

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assertiveness (over all)</td>
<td>9.29</td>
<td>20.89</td>
</tr>
<tr>
<td>1st year</td>
<td>10.461</td>
<td>18.44</td>
</tr>
<tr>
<td>2nd year</td>
<td>3.83</td>
<td>22.08</td>
</tr>
<tr>
<td>3rd year</td>
<td>19.96</td>
<td>20.34</td>
</tr>
<tr>
<td>4th year</td>
<td>2.9</td>
<td>18.89</td>
</tr>
<tr>
<td>Self-esteem (over all)</td>
<td>21.07</td>
<td>3.36</td>
</tr>
<tr>
<td>1st year</td>
<td>21.03</td>
<td>3.95</td>
</tr>
<tr>
<td>2nd year</td>
<td>21.33</td>
<td>2.98</td>
</tr>
<tr>
<td>3rd year</td>
<td>21.76</td>
<td>3.21</td>
</tr>
<tr>
<td>4th year</td>
<td>20.16</td>
<td>3.18</td>
</tr>
</tbody>
</table>

Table:2 shows that the mean value of assertiveness is 9.29 (SD. 20.89) and that of the self-esteem is 21.07 (SD. 3.36).

B. Comparison between group mean scores of assertiveness and self esteem.

Table 3: Comparison between group means of assertiveness and self esteem of students. n=120

<table>
<thead>
<tr>
<th>Variables</th>
<th>Source of variation</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F value</th>
<th>'p' value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assertiveness</td>
<td>Between groups</td>
<td>5643.292</td>
<td>3</td>
<td>1881.097</td>
<td>4.755**</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>45888.63</td>
<td>116</td>
<td>395.592</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self esteem</td>
<td>Between groups</td>
<td>41.158</td>
<td>3</td>
<td>13.719</td>
<td>1.219</td>
<td>0.306</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>1305.167</td>
<td>116</td>
<td>11.251</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Significant, p<0.01

Table:3 The ANOVA test for comparison of group means of assertiveness and self esteem showed that the 1st year and third year students have significantly higher levels of assertiveness compared to 2nd and 4th year students. But the groups do not differ in terms of self esteem.

C. Level of assertiveness of students

Level of assertiveness

Figure:1. Distribution of students based on level of assertiveness

Figure:1 shows that only 26.7% of the sample is assertive. Majority (39.2%) are somewhat assertive and 7.5% are aggressive also.
D. Level of self-esteem of undergraduate nursing students

Figure:2. Distribution of students based on levels of self-esteem

Figure:2 depicts that majority of the students (85%) has average self-esteem and 15% has high self-esteem. No subjects has low self esteem.

Section III. Correlation between assertiveness and self-esteem of students

Table:4 Karl Pearson correlation coefficient computed between assertiveness and self-esteem of students  

<table>
<thead>
<tr>
<th>Assertiveness</th>
<th>'r' value</th>
<th>'p' value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>0.139</td>
<td>0.463</td>
</tr>
<tr>
<td>2nd year</td>
<td>0.455*</td>
<td>0.012</td>
</tr>
<tr>
<td>3rd year</td>
<td>0.274</td>
<td>0.143</td>
</tr>
<tr>
<td>4th year</td>
<td>0.459*</td>
<td>0.011</td>
</tr>
<tr>
<td>Total</td>
<td>0.131</td>
<td>0.154</td>
</tr>
</tbody>
</table>

* Significant, p<0.05

Table:4 shows no correlation between the overall assertiveness and self-esteem of students. But moderate positive correlation is found between the assertiveness and self-esteem of the 2nd year and 4th year students.

Section IV. Association between assertiveness and sample characteristics.

Statistically significant association between assertiveness level and the year of study (X^2=12.80, df=6, p= 0.04), medium of instruction before nursing (X^2=16.05, df=4, p= 0.003), participation in extra curricular activities (X^2=7.694, df=2, p= 0.021) and percentage of marks obtained in plus two examination(X^2=27.48, df=16, p= 0.036).

Section V. Association between self-esteem and sample characteristics

Self esteem was associated only with students who rated themselves as introverts (X^2= 4.01, df=1, p< 0.05).

DISCUSSION

A. Assertiveness skills of nursing students

It is universally acknowledged that assertiveness skills are essential at all levels of the health service and in all roles from student nurse to experienced practitioner. The current study found that only 26.7% of the nursing students are assertive as per Rathus Assertiveness Schedule. The subjects in this study might have a way of thinking that raising doubts, questions and clarifications, showing one’s importance are less desirable habits of good individuals and they might have desired to be nice students. When compared to a study on factors affecting assertiveness, conducted among 207 student nurses of Port-Said University, this 26.7% is very less. Sixty percentage of the subjects in that study were found to be assertive.

According to summed results and comparison between groups, it has been noticed that the nursing education has not increased the assertiveness skills of the subjects; the final year students had the least assertiveness skills when compared to students of other years. A most recent study which assessed the effect of nurse education on the self-esteem and assertiveness of nursing students has found diminished assertiveness levels at the end of the fourth year. But this finding is contradicting with Cecily M. Begley and Michele Glacken who reported an increase in nursing student’s assertiveness levels at the completion of their education programme. Their study sample was having eight hours of theoretical contact time devoted to learning assertiveness skills during their three-year educational programme. But the sample in the current study had no prescribed hours in their syllabus for learning assertiveness skills. The level of assertiveness of students being this low is worth attention necessitating the nurse educators to think about the reasons for such a decrease.
B. Self-esteem of nursing students

The sample was found to have an average self-esteem (Mean=21.07, SD 3.36). Only 15% had high self esteem, also the final year students were having the lowest mean when compared to students of other years self-esteem, even though a statistically significant difference was not seen. This may be attributed to the stress the students experience towards the end of the educational programme. A study which investigated nursing students’ experiences of stress levels and self-esteem during three years of their undergraduate nursing programme also has reported lowest self-esteem levels at the end of training\(^{18}\). But the subjects in a recent longitudinal study demonstrated increase in self esteem at the end of the 4-year nursing programme\(^{16}\). Further research must be conducted to identify the influential factors of self-esteem.

C. Correlation between assertiveness and self-esteem of nursing students.

Unlike with other studies in the literature\(^{19,20}\), the current study showed no correlation between the overall assertiveness and self-esteem of students. But moderate positive correlation was observed between assertiveness and self-esteem of the 2\(^{nd}\) year and 4\(^{th}\) year students.

The current study revealed statistically significant association between levels of assertiveness and the personal variables like year of study, medium of instruction before joining nursing, participation in extra curricular activities and percentage of marks obtained in plus two examination. High self esteem was associated with students who rated themselves as introverts. Both assertiveness and self esteem had no association with students’ ordinal position in the family, family income, parents’ education and occupation.

Many researchers have identified that assertiveness skills and self-esteem can be learned and students of nursing can significantly benefit from assertiveness training programmes to increase their assertiveness skills and self-esteem\(^{21,22}\). So it is better to have prescribed hours of theoretical learning on assertiveness and assertiveness training mandatory in the undergraduate nursing education programme.

**Conflict of Interest-** Nil.

**Source of Funding-** This research work was financially supported by Amrita Institute of Medical Sciences, Kochi.

**Ethical Clearance -** The study was approved by the institutional ethical committee and permission was sought from the Principal. The sample was informed of the purpose of the study and written informed consent was obtained.

**REFERENCES**

7. Serdar SUCAN, Mehmet Behzat TURAN, Osman PEPE, Doğan DOĞAN. The Relationship with Self Esteem Between Assertiveness Levels of Sub-Elite In-Door Soccer Players. International Journal of Science Culture and Sport July 2015 : Special Issue 3. 156-162
8. Trzesniewski KH, Donnellan MB, Robins RW.


Qualitative Study on What Makes a Primary Health Center Gets Utilized, in Belgaum District North Karnataka India

Devika Pandurang Jeeragyal, Sasidhar M, Archana A M, K R John

1Assistant Professor, Department of Community Medicine, Apollo Institute of Medical Science and Research, Chittoor Dist. A.P, 2Deputy Civil Surgeon.CHC Tanakal, Anathapur. Dist, A.P, 3Msc. Biotechanology. Junior Scientist, 4Professor and Head of the Department of Community Medicine, Apollo Institute of Medical Science and Research, Chittoor Dist. A.P

ABSTRACT

Introduction: Primary health center is to provide the primary health care that is essential health care based on practice, scientifically sound and socially acceptable methods and universally acceptable to individuals and families in the community through their full participation and at a cost the community and country can afford. PHC is a back bone of Indian public health system. In the Indian context, it is very important for all PHC to get utilized so that people who cannot afford need not pay in the private sectors. Aims and Objectives: The aim of the study was to explore and develop the framework of the factors that contribute to utilization of health care services at primary health center. The study was conducted with the objective to understand the factors that contribute for better utilization of services at PHC. Method and materials: Qualitative study was done to explore the factors contributing for utilization of Primary health center (PHC). Result: Six PHC were selected and total 26 interviews and 6 Focus group discussion (FGD) were conducted. Factors contributing for utilization were summarized. Important determinants for better utilization of PHC were staff staying in head quarters, 24/7 services, staff interaction with patient, reputation of the PHC, informal payment, community ownership and political will, infrastructure, and referral services. Can apply these factors to other PHCs where the services are not utilizing properly.

Keywords: Primary health center, services, utilization, contributing factors. Framework

INTRODUCTION

The concept of primary health care came into lime light in 1978 following the International conference in Alma Ata, USSR. It has been defined as, Essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and the country can afford to maintain at every stage of their development in the spirit of self determination. The main components of primary care were identified to be context specific, focus on preventive, promotive and rehabilitative services, provide health education, intersectoral coordination, community participation and empowering the health worker team. World health report 2008 has emphasized again on the need of primary health care. The reports call for the revisiting the ideas of primary health care, making reforms that go beyond the provision of “essential” care and for inclusion of demand-side factors in primary care Bhore committee recommended PHC for 20,000 population having 35 health personnel and supporting health center for every 40,000 population. Mudaliar changed this in 1961 PHC with 40,000 population and focused on quality of services. The Kartar Singh committee in 1976 emphasized on inclusion of multipurpose workers in sub centers PHC are considered as backbone of public health system. Under NRHM, one PHC is recommended for 30,000 populations. This is the first tire of public health system where there is a qualified medical officer.
Selection process: 2 PHCs are selected, all the participants were explained the purpose of the study and potential benefits.
from the study, after obtaining the informal consent interviews and focus group discussion were conducted and confidentiality maintained. No personal identifiable information has been collected on any of the participants. FGDs were audio recorded and recording was deleted.

**RESULTS AND DISCUSSION**

Table No: 1  Details of study participants:

<table>
<thead>
<tr>
<th>PHC</th>
<th>METHOD</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical officer</td>
<td>Interview</td>
<td>1</td>
</tr>
<tr>
<td>Staff nurse</td>
<td>Interview</td>
<td>1</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>Interview</td>
<td>1</td>
</tr>
<tr>
<td>Class IV (peon)</td>
<td>Interview</td>
<td>1</td>
</tr>
<tr>
<td>Community</td>
<td>FGD</td>
<td>1</td>
</tr>
</tbody>
</table>

Four interviews and one Focus group discussion in each PHC. Total six PHCs: 24 interviews and 6 FGDs.

Table No: 2  Key informants

<table>
<thead>
<tr>
<th>District Health Officer</th>
<th>Interview</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taluka Health Officer</td>
<td>Interview</td>
<td>1</td>
</tr>
</tbody>
</table>

DHO AND THO were key informants to provide the authentic information

This study aimed at identifying various factors influencing the utilization of health services at PHC. Some of the important factors are emerged as important themes and are enumerated below:

1. **Head quarters stay:** PHCs were better utilized if the staff including Medical officer is staying at Head Qtrs. It was the opinion of community through FGDs and also from staff while interviewing. Community people gave their opinion that Head quarters stay is very important in case of emergencies, accidents and deliveries.

   “Myself and Staff nurse will be there for 24 Hrs. If any case including emergency comes I will diagnose myself where the patient is serious or not by looking at the people who have brought them will be in anxious state. So I will rush to Medical officer qtrs. Our sir will come in night dress only to attend the case as early as possible without any delay.

   (Peon interview, well utilized PHC). So the presence of the Medical officer at the PHC will increases the community confidence and there by develop the trust.

2. **24 Hours services:** It is possible to gain the confidence of the people if the emergency situations are tackled effectively at PHC, and to tackle the emergency situations Medical officer with his team should be there all the 24 Hrs as we do not know when the emergency cases will come. “Day before yesterday we brought one snake bite patient at mid night 1.30am. Sister herself went to call doctor and they treated the patient immediately. We stayed there in the hospital till next day morning. So we are very much sure that the services will be available all the 24 Hrs by doctor and his team. If something happens at any time will come to this Government hospital only…. (FGD)

3. **Staff interaction with the patients:** It has been observed that in the PHCs where the services are better utilized, the communication and cooperation between health staff and patients were very good. If the staff speaks politely gently, patients feel comfortable to discuss their health issues. And in such PHCs it was also observed that old age people, pregnant mother, children and serious patients were given first priority.

   “Many patients will come to our PHC just because of our cooperation….When they will enter the hospital I will welcome them and ask to sit. I will offer a glass of cold water as they have come from far of places. They feel very happy, comfortable. Elderly people will bless me and some people will tell that even my wife will not serve like this when I go home…… I always see that pleasant atmosphere should be created.

4. **Reputation/History of the PHC:** PHCs who will provide the better services will always have the better reputation than the PHCs which are not that good to provide the services. Reputation is usually based on characteristic of staff, their interaction their availability their quality of services and provision of medicine. This reputation will become the tradition to utilize the services. “When we were small our grandparents use to carry us on their shoulder to this Gove hospital. Today we are bringing our grand children to this hospital. We always come to this hospital since many years. (FGD Well utilized PHC).

5. **Informal payment:** We observed that the PHC with availability, accessibility will also be affordable. There will not be any bribe. All the services including
deliveries and investigation and medicine will be free of cost. "Our doctor is like God he will treat us free of cost he will not take single pisa. So many times he himself has given me the bus charge. God bless him (FGD Well utilized PHC).

6. Community ownership and political will: It has been observed that the PHC which was identified by the community will have the local, social and political support; such PHCs will be better utilized by the people. When the community will accept that PHC as their own hospital, they will come forward to take responsibilities of it like improvement, repairing, donating the land, supporting in the crises. The ownership was expressed by the people....The Govt hospital is our own hospital, the staff working there are all our family members. They are taking care of us, so we will also take care of them. We have given 200 coconut trees with one person that is Gardner to maintain the garden in our hospital and with this garden this hospital, is looking like a private hospital. Now we have donated a area for kitchen construction for tubectomy patients. Just now we brought a truck of sand bricks and cement and tomorrow onwards the work will start. (FGD Well utilized PHC).

7. Infrastructure: Better facilities like water supply, electricity supply, separate male and female toilet facilities, privacy and cleanliness are very important to attract the patients for utilization of health services. In addition well equipments and drug availability is also important. We never felt in secured in this hospital. All facilities are available here, except TV (Lady Patient while interviewing).

8. Referral services: Whenever it is essential it is very important to refer the patient to the higher centers especially in emergency cases. PHC medical officer should have a strong referral network with higher centers. Immediately he should inform them that such and such patient I am referring with referral note, so they will be alert and make arrangement to receive and to provide the immediate services without any delay. “We lost our hope, we were praying for our daughter. Ultimately they gave blood and did caesarian section, now both mother and child are healthy and happy. Later were came to know that our Doctor has told everything including blood transfusion, blood grouping. Operation … so they immediately gave the blood and did the operation (FGD Well utilized PHC).

CONCLUSION

Table No: 3 FRAME WORK OF FACTORES, CONTRIBUTING FOR BETTER UTILIZATION OF PHCs

<table>
<thead>
<tr>
<th>HUMAN RESOURCES</th>
<th>PHC IMAGE</th>
<th>GOVERNANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff including the medical officer stays at headquarter. Interaction of staff with patients good</td>
<td>PHC has a good reputation. (No adverse events) Referral network: Well established.</td>
<td>Informal payment. Good infrastructure Sufficient drugs and other facilities.</td>
</tr>
<tr>
<td>24/7 Services available.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The key factors from the framework are the presence of permanent residential staff at the PHC location is very critical factor for the better performance and responding to people’s needs. 24/7, 365 days service is another important aspect to categorize PHC as well functioning. Patient communication counseling is very important for better utilization of services. Image and reputation of PHC and Staff is also important to attract the patients. The provision of free and quality services is an important aspect of better performing APHC compared to PHC where informal payment and bribes are a norm. Corruption in Public health is a disease. Community ownership is equally important for successful functioning of PHC. Political will and support is very essential for the functioning of PHC. Having good infrastructure and facilities for both patients and staff is also crucial. Having referral network is very important to save the lives of emergency patients.

Recommendation: For a PHC to be utilized, only the improvement of infrastructure and filling up the vacant posts is not adequate. In addition, it is important for the health system/policies to strive to Enable PHCs to provide quality services around the clock and make arrangement for the staff to stay at the head quarters. Implementing anti corruptive measures in health system. Strengthening the referral services and build the confidence of staff at all the level. Generate good local political and social support.

Source of Funding - Self

Conflict of Interest - Nil
REFERENCES


4. Mudaliar committee-1962- “Health Survey and Planning Committee”.


An Awareness Survey on Safe Sexual Practice among First Year Medical Students

Samir Chattopadhyay¹, Arvind K Shukla², Salki Matta³, Nandini Sethi⁴, Neha Rani⁴
¹Professor, ²Asst Prof, ³Junior Resident, ⁴Undergraduate, Department of Community Medicine, Subharti Medical College, Meerut, Uttar Pradesh

ABSTRACT

A cross sectional study was carried out to assess awareness of safe sex among first year MBBS students. 142 students were selected by purposive sampling and a structured questioner was administered.

Overall awareness of safe sexual practices among the students was low. Compared with students of foreign countries, our subjects appeared to be conservative as regards premarital sex. Awareness about contraceptive methods was poor. Awareness level of efficacy of condoms in preventing AIDS, STDs, pregnancy was good. Awareness level of girls about masturbation was lower than boys. There were misconceptions about masturbation. Boys were more concerned about loss of potency and sperm count whereas girls were concerned with infertility. Girls were more inquisitive about oral sex. Boys and girls were almost equally inquisitive about masturbation. Sex education at school level was found to be unsatisfactory.

Keywords: Safe sex, STDs, Masturbation, Extra/pre marital sex, Contraception

INTRODUCTION

Safe sex is defined as sexual activity taken with precautions that prevent sexually transmitted infections as well as pregnancy. Adolescent abortions are estimated to be up to 4.4 million per year [¹]. These are all results of lack of sex awareness about sex and unsafe sexual practice.

The strongest predictors of the sexual behaviour are students’ knowledge about sexuality related issues, attitude towards sex, and the levels of social interaction and exposure to erotic material [²]. Adolescent and young people constitute a vulnerable population because of lack of awareness about sex and careless life style that is relevant of young age.

Various knowledge, attitude and practice studies bring out disturbing low level of contraceptive awareness among adolescence [¹]. Some study indicates though most young men had at least a moderate level of knowledge, the vast majority engaged in unprotected intercourse [²].

Hence it was decided to carry out an awareness survey amongst student of 1st year who were not yet exposed to medical knowledge.

AIMS AND OBJECTIVE

To assess the awareness of safe sex amongst 1st year medical students.

MATERIALS AND METHOD

Study design: Descriptive cross sectional study.

Study population: 1st year M.B.B.S students.

Sampling size: 142

Sampling technique: Purposive

Inclusion criteria: Those who were present & willing to participate.

Exclusion criteria: Those absent or unwilling.

Data was collected on a structured questionnaire applied to the study subjects and analyzed in Microsoft excel and IBM SPSS-19 version.

After administration of the questionnaire, the participants were asked to submit any query they were...
having about safe sexual practice in a piece of paper, were shown a visual presentation on safe sexual practices and queries discussed. An effort was made to carry out a qualitative analysis of the data obtained from such interaction with the study subjects.

RESULTS

TABLE 1: DEMOGRAPHIC PROFILE

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE (In years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>8</td>
<td>5.6</td>
</tr>
<tr>
<td>18</td>
<td>31</td>
<td>21.8</td>
</tr>
<tr>
<td>19</td>
<td>67</td>
<td>47.2</td>
</tr>
<tr>
<td>20</td>
<td>29</td>
<td>20.4</td>
</tr>
<tr>
<td>21</td>
<td>5</td>
<td>3.5</td>
</tr>
<tr>
<td>22</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td>SEX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEMALE</td>
<td>63</td>
<td>44.4</td>
</tr>
<tr>
<td>MALE</td>
<td>79</td>
<td>55.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>142</td>
<td>100.0</td>
</tr>
</tbody>
</table>

TABLE 2: SAFE SEX

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>FREQ</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELF ASSESSMENT OF AWARENESS ABOUT SAFE SEXUAL PRACTICES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPLETE AWARENESS</td>
<td>38</td>
<td>26.8</td>
</tr>
<tr>
<td>DON’T KNOW</td>
<td>25</td>
<td>17.6</td>
</tr>
<tr>
<td>PARTIAL AWARENESS</td>
<td>79</td>
<td>55.6</td>
</tr>
<tr>
<td>SOURCES OF LEARNING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANY ONE SOURCE</td>
<td>45</td>
<td>31.7</td>
</tr>
<tr>
<td>ANY TWO SOURCE</td>
<td>63</td>
<td>44.4</td>
</tr>
<tr>
<td>ANY THREE SOURCE</td>
<td>26</td>
<td>18.3</td>
</tr>
<tr>
<td>MORE THAN THREE SOURCE</td>
<td>8</td>
<td>5.6</td>
</tr>
<tr>
<td>REASON FOR ADOPTING SAFE SEXUAL PRACTICES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PREVENTION OF DISEASES</td>
<td>91</td>
<td>64.1</td>
</tr>
<tr>
<td>MARITAL HARMONY</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td>GAINING FAITH OF PARTNER</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>MORALITY</td>
<td>1</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Cont... TABLE 2: SAFE SEX

<table>
<thead>
<tr>
<th></th>
<th>FREQ</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANY TWO OF THE ABOVE</td>
<td>24</td>
<td>16.9</td>
</tr>
<tr>
<td>ANY THREE OF THE ABOVE</td>
<td>8</td>
<td>5.6</td>
</tr>
<tr>
<td>ALL OF THE ABOVE</td>
<td>16</td>
<td>11.3</td>
</tr>
<tr>
<td>SEX EDUCATION CLASSES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOT ATTENDED</td>
<td>81</td>
<td>57.0</td>
</tr>
<tr>
<td>ATTENDED</td>
<td>61</td>
<td>43.0</td>
</tr>
<tr>
<td>DISCUSSION OF SAFE SEX IN CLASSES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOT DISCUSSED</td>
<td>4</td>
<td>2.8</td>
</tr>
<tr>
<td>NA (NOT ATTENDED SUCH CLASSES)</td>
<td>82</td>
<td>57.7</td>
</tr>
<tr>
<td>DISCUSSED</td>
<td>56</td>
<td>39.4</td>
</tr>
<tr>
<td>SPREAD OF DISEASES BY UNSAFE SEX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWARE</td>
<td>142</td>
<td>100.0</td>
</tr>
<tr>
<td>NAMES OF THE COMMON DISEASES TRANSMITTED BY UNSAFE SEX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWARE</td>
<td>77</td>
<td>54.2</td>
</tr>
<tr>
<td>PARTIALLY AWARE</td>
<td>65</td>
<td>45.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>142</td>
<td>100.0</td>
</tr>
</tbody>
</table>

TABLE 3: MASTURBATION

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>FREQ.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFFECTS OF MASTURBATION ON HEALTH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DON’T KNOW</td>
<td>54</td>
<td>38</td>
</tr>
<tr>
<td>NOT INJURIOUS TO HEALTH</td>
<td>63</td>
<td>44.4</td>
</tr>
<tr>
<td>INJURIOUS TO HEALTH</td>
<td>25</td>
<td>17.6</td>
</tr>
<tr>
<td>EFFECTS OF MASTURBATION ON LOSS OF POTENCY/ VIRGINITY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWARE</td>
<td>32</td>
<td>22.5</td>
</tr>
<tr>
<td>DON’T KNOW</td>
<td>110</td>
<td>77.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>142</td>
<td>100.0</td>
</tr>
</tbody>
</table>

TABLE 4: ATTITUDE

<table>
<thead>
<tr>
<th>APPROPRIATE AGE (IN GROUP) FOR FIRST SEXUAL INTERCOURSE (YEARS)</th>
<th>FREQ</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-18</td>
<td>58</td>
<td>40.8</td>
</tr>
<tr>
<td>19-21</td>
<td>46</td>
<td>32.4</td>
</tr>
<tr>
<td>22-24</td>
<td>17</td>
<td>12.0</td>
</tr>
<tr>
<td>25 AND ABOVE</td>
<td>21</td>
<td>14.8</td>
</tr>
</tbody>
</table>
Cont.. TABLE 4: ATTITUDE

<table>
<thead>
<tr>
<th>APPROPRIATE RELATIONSHIP FOR FIRST SEXUAL INTERCOURSE</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTSIDE MARRIAGE</td>
<td>77</td>
<td>54.2</td>
</tr>
<tr>
<td>WITHIN MARRIAGE</td>
<td>65</td>
<td>45.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PERCEPTION ABOUT PREMARITAL SEX</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IMMORAL</td>
<td>70</td>
<td>49.3</td>
</tr>
<tr>
<td>MORAL</td>
<td>72</td>
<td>50.7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>142</td>
<td>100.0</td>
</tr>
</tbody>
</table>

TABLE 5: SEXUALLY TRANSMITTED DESEASES

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>FREQ</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHETHER HEARD OF AIDS.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YES</td>
<td>142</td>
<td>100.0</td>
</tr>
</tbody>
</table>

| MODES OF TRANSMISSION OF HIV                  |   |   |
| ADEQUATELY AWARE                              | 36 | 25.4|
| DON'T KNOW                                     | 1 | 0.7 |
| PARTIALLY AWARE                               | 105 | 73.9|

| PREVENTION OF HIV                             |   |   |
| ADEQUATELY AWARE                              | 17 | 12 |
| DON'T KNOW                                     | 6 | 4.2 |
| PARTIALLY AWARE                               | 119 | 83.8|

| SYPHILLIS                                      |   |   |
| AWARE                                           | 8 | 5.6 |
| NOT AWARE                                       | 50 | 35.2|
| PARTIALLY AWARE                                | 84 | 59.2|

| GONORRHOEA                                     |   |   |
| AWARE                                           | 3 | 2.1 |
| NOT AWARE                                       | 53 | 37.3|
| PARTALLY AWARE                                  | 86 | 60.6|

| HPV INFECTION                                  |   |   |
| AWARE                                           | 4 | 2.8 |
| NOT AWARE                                       | 105 | 73.9|
| PARTIALLY AWARE                                | 33 | 23.2|
| TOTAL                                           | 142 | 100.0|
### TABLE 6: CONTRACEPTION

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>FREQ</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFE PERIOD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADEQUATELY AWARE</td>
<td>45</td>
<td>31.7</td>
</tr>
<tr>
<td>DON’T KNOW</td>
<td>59</td>
<td>41.5</td>
</tr>
<tr>
<td>PARTIALLY AWARE</td>
<td>38</td>
<td>26.8</td>
</tr>
<tr>
<td>POSSIBILITY OF PREGNANCY FOLLOWING FIRST INTERCOURSE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOT POSSIBLE</td>
<td>22</td>
<td>15.5</td>
</tr>
<tr>
<td>POSSIBLE</td>
<td>120</td>
<td>84.5</td>
</tr>
<tr>
<td>CONDOM FOR PREVENTION OF STDs/AIDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOT PROTECTIVE</td>
<td>10</td>
<td>7.0</td>
</tr>
<tr>
<td>PROTECTIVE</td>
<td>132</td>
<td>93.0</td>
</tr>
<tr>
<td>VARIOUS CONTRACEPTIVE METHODS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADEQUATELY AWARE</td>
<td>83</td>
<td>58.5</td>
</tr>
<tr>
<td>DON’T KNOW</td>
<td>8</td>
<td>5.6</td>
</tr>
<tr>
<td>PARTIALLY AWARE</td>
<td>51</td>
<td>35.9</td>
</tr>
<tr>
<td>MOST SUITABLE METHOD OF CONTRACEPTION FOR YOUNG ADULTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADEQUATELY KNOW</td>
<td>40</td>
<td>28.2</td>
</tr>
<tr>
<td>DON’T KNOW</td>
<td>23</td>
<td>16.2</td>
</tr>
</tbody>
</table>

### TABLE 7: EFFECTS OF MATURBATION ON HEALTH

<table>
<thead>
<tr>
<th>KNOWLEDGE ABOUT MASTURBATION</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FREQ</td>
<td>%</td>
<td>FREQ</td>
</tr>
<tr>
<td>DON’T KNOW</td>
<td>23</td>
<td>29.1</td>
<td>31</td>
</tr>
<tr>
<td>NOT INJURIOUS TO HEALTH</td>
<td>38</td>
<td>48.1</td>
<td>35</td>
</tr>
<tr>
<td>INJURIOUS TO HEALTH</td>
<td>18</td>
<td>22.8</td>
<td>7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>79</td>
<td>100.0</td>
<td>63</td>
</tr>
</tbody>
</table>

χ² - VALUE = 6.90; P-VALUE = 0.03 (SIG.)

### TABLE 8: EFFICACY CONDOM PREVENTING AIDS/STDs

<table>
<thead>
<tr>
<th>CONDOM PREVENTING AIDS/STDs</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FREQ</td>
<td>%</td>
<td>FREQ</td>
</tr>
<tr>
<td>NOT PROTECTIVE</td>
<td>2</td>
<td>2.5</td>
<td>8</td>
</tr>
<tr>
<td>PROTECTIVE</td>
<td>77</td>
<td>97.5</td>
<td>55</td>
</tr>
<tr>
<td>TOTAL</td>
<td>79</td>
<td>100.0</td>
<td>63</td>
</tr>
</tbody>
</table>

χ² - VALUE = 5.53; P-VALUE = 0.01(SIG.)
DISCUSSION

A total 142 students of first year M.B.B.S (79 boys and 63 girls) participated. All were aged between 17 and 22.

26.8% were aware about safe sexual practice while 55.6% were partially aware. 17.6% had no knowledge. Male female difference in awareness level was not statistically significant (p=0.9).

Source of knowledge was more than two sources for 62.7% cases. Basim found that internet was the highest source of knowledge followed by Friends, and T.V and books[3]. Fageeh found most common source of information was mass media than school[4].

In our study, all were aware that diseases could be spread by unsafe sex. 54.2% were aware about the names of the traditional six STDs that could be transmitted by unsafe sex. Rest were partially aware. 64.1% believed that safe sexual practice was required to prevent disease. Male female difference in awareness about names of the diseases transmitted by unsafe sex also was not significant (p=0.3). In a systematic study in school going children in Europe, low levels of awareness and knowledge of sexually transmitted diseases was found, with the exception of HIV/AIDS. Awareness was generally high for HIV/AIDS (above 90%) and low for HPV (range 5.4%-66%),[3] which was similar to our finding.

In our study all students had previously heard about AIDS. Only 25.4% of students knew mode of transmission of HIV. 73.9% students had partial knowledge and 0.7% students had no knowledge regarding this. 12% students were fully aware about how to prevent HIV. 83.8% students were partly aware and most of them mentioned safe sex as a measure. 4.2% students had no idea regarding it.

We found 5.6% of students were fully aware about syphilis including its lesions while some (59.2%) were only aware about syphilis as a STD and no other details. Rests of the students were unaware. Basim in a study among University students, found the majority of the participants were familiar with HIV and genital herpes. A considerable proportion was not aware of syphilis, genital warts, hepatitis B and gonorrhea as STDS[3].

2.1% of our students were fully aware about gonorrhea including its lesions while some (60.6%) were only aware of the name gonorrhea as a STD and no other details. Rest were unaware. 2.8% of students were fully aware about HPV while (23.2%) were partially aware. Majority students were not aware about HPV infection. Whereas in the study by Basim, majority of the participants were familiar with HIV and genital herpes. A considerable proportion was not aware of syphilis, genital warts, hepatitis B and gonorrhea as STDS[3].

No significant difference between boys and girls in awareness about syphilis gonorrhoea and prevention of AIDS was found in our study.

In our study only 1.4% students were aware about consequence of HPV infection. 2.8% were partially aware. Yactobi et al found only 37% of respondents had ever heard of HPV.[6] Large no of students i.e., 95.8% were totally unaware. This was in contrast with findings of Mary et al who found more than 75% of the sample had heard of HPV[7].

40.8% students considered that 16-18 years of age as appropriate for first sexual intercourse. 32.4% considered 19-21 years and 26.8% believed 22 years and above as appropriate. 54.2% students considered first sexual intercourse before marriage as appropriate. Rest believed it should be within marriage only. 50.7% considered premarital sex as morally correct. While others considered it immoral.

In a study in North Indian cities 16 years was considered appropriate age to start sexual practice was though youngest age reported was of 14 years[1]. This along with other studies indicate that young generation attitude towards premarital sex is changing. It is becoming more liberal.[2] Premarital sex among adolescents is considerable and is not influenced by residential and educational status[3].

In this regard our finding differed from that among Chinese University students wherein 76% considered pre-marital sex acceptable[9].

84.5% of our study subjects believed that it was not possible to get pregnant following first intercourse while rest thought otherwise.

44.4% students believed that masturbation was not injurious to health. 38% of them had no knowledge while the rest (17.6%) considered it as injurious to
health. 22.5% of the students believed that masturbation does not cause loss of potency in males and virginity in females. Most (77.5%) had no idea about this.

More girls (49.20%) were unaware of masturbation than boys (29.11%) and more boys (48.10%) than girls (39.68%) believed it as not injurious to health. This difference was statistically significant (p = 0.03). Belief about loss of potency in males and virginity in females due to masturbation was same between boys and girls.

93% of the students were aware of efficacy of the condom in preventing STDs. Rests were not aware. 97.46% boys and 87.30% girls knew that it was protective against STDs/AIDS. Difference was significant (P = 0.01)

58.5% of students were aware about various contraceptives measures and mentioned few of them. 35.9% had partial knowledge. Surprisingly, 5.6% had no idea about it.

In a study in south Delhi more than 1/3rd of the students had no accurate understanding of the signs and symptoms of STIs other than HIV/AIDS. About 30% of respondents considered HIV/AIDS could be cured, 49% felt that condoms should not be available to youth, 41% were confused whether the contraceptive pills could protect against HIV infection and 32% thought that it could taken only by married women.[9]

87.3% were aware of teen pregnancy.

Majority students (78.2%) had adequate knowledge about emergency pills while others had no knowledge. Only 31.7% had adequate knowledge about Safe Period. 26.8% had partial knowledge whereas, 41.5% did not know it.

Awareness about planned contraception was lower than Emergency Contraception. Only 58.5% students were adequately aware of various contraceptive measures. This awareness was still lower (28.2%) about method most appropriate for young adults. Awareness about Emergency contraception was relatively higher (78.2%). Varied level of awareness about condom was found. Only 17.6% of the students were aware of efficacy of condom is very in preventing pregnancy. 57% of the students had seen a condom whereas, 43% had never seen. Only 17.6% respondents knew how to wear a condom and 12% knew it partially.

**SUMMARY OF THE QUESTIONS ASKED BY STUDY SUBJECTS**

A total of 41 questions received. Most frequently asked question was on masturbation. Following points were raised by the study subjects:

**I-MASTURBATION:**

1. Effects/ill effects of masturbation on health/mental health (raised by both boys and girls).
2. Whether potency of male decreases by masturbation (raised by boys).
3. Whether potency of eggs lost by masturbation (raised by girls).
4. Whether virginity of girls lost by masturbation (raised by both boys and girls).
5. Frequency limit of masturbation (raised by boys).
6. Reason for masturbation (raised by both boys and girls).
7. Benefits of masturbation (raised by both boys and girls).
8. Is it a regrettable offence (raised by girls) or regrettable before marriage (raised by boys).
9. How to avoid masturbation (raised by boys).
10. Minimum age to start masturbation (raised by girls).
11. Whether frequent masturbation affect sperm count and nervous system.
12. Why does night fall occur? (raised by boys)

**II-ORAL SEX:**

Whether oral sex is unhygienic and swallowing semen is harmful for health. (Raised by girls)

**III- PRE-MARITAL SEX:**

Whether premarital sex affect health. (Raised by boys and girls)
1. Whether it is ok?
2. Why not socially acceptable?

**IV- RIGHT AGE TO START SEX:**

1. What should be appropriate age to start the sex. (raised by both boys and girls)

**V- WATCHING PORN:** (raised by both boys and girls)
1. Whether watching porn can affect health.
2. Reason for not watching pornography.

VI-TEENAGE PREGNANCY:
1. Why teenage pregnancy is harmful for health.
   (Raised by girls)

VII- CONDOM USE:
1. Whether condom is necessary for anal and oral sex.
2. How to wear a condom.

VIII- ABSENTEE FROM SEX AFTER DELIVERY:
1. How long one should abstain from sex after delivery. (Raised by girls only)

IX- STD: (Raised by girls only)
1. Whether leucoria causes STD?
2. What is HPV infection?

It was evident that girls had raised queries which were concerned with issues involving the females and boys had the queries on issues of more concerns of the males. It revealed gender specific apprehensions about sex and sexuality.

CONCLUSION

Low level awareness was found. Most of the students were having superficial knowledge. Study subjects were aware of names of the six traditional STDs and AIDS. However very few were aware of HPV. Subjects were aware of efficacy of condoms in preventing STDs and pregnancy. There was misconception about masturbation. Sex education in school was unsatisfactory. General awareness about planned contraception was low.

Girls expressed concern about the issues which affect them more like oral sex, teen age pregnancy. Girls appeared more concerned about STDs.

Acknowledgement: Nil

Conflict of Interest : Nil

Source of Funding : NA

Ethical Clearance: Ethical clearance taken from institutional ethical committee.

REFERENCES
1. Trikha Sonia. Abortion scenario of adolescence in North Indian city evidence from recent study. Indian Journal of Community Medicine, 2001 Vol. XXVI, No. 1, Jan-Mar
2. Abraham Leena, Kumar Anil K. Sexual experiences and their correlates among college students in Mumbai city, India. International family planning perspectives1999 vol.25 No. 3
4. Fageeh Wafa M. Awareness of Sexually Transmitted Diseases among Adolescents in Saudi Arabia. JKAU: Med Sci; vol 15 No 1, 77-90
Prevention of Catheter Associated Urinary Tract Infection (CAUTI)

Manu Acha Roy¹, Nisha Philip², Deepa Fulwadiya², Shruti Dhabade³

¹HOD Paediatric Nursing, Symbiosis College of Nursing, Symbiosis International University, Pune, ²MSc Nursing 2nd Year, Symbiosis College of Nursing, Pune, ³BSc Nursing 4th Year Symbiosis College of Nursing, Pune

ABSTRACT

Urinary tract infections (UTIs) are a major public health problem in terms of morbidity and incur the highest total health care cost among urological diseases, exceeding that of chronic renal failure even when renal dialysis and renal transplantation are included. This study was conducted to assess the practice of staff nurses regarding prevention of UTI in clients with indwelling catheter.

An evaluative approach was adopted for the study to determine the effectiveness of structured teaching program on practice among staff nurses regarding prevention of urinary tract infection in patients with indwelling catheter. Pre -experimental, one group pre-test – post-test design was used for conducting the study. The result shows that the mean practice score in the post-test (18.56+ 3.88) was higher than the mean pre-test practice score(10.4+ 4.39),which is highly significant as p value <0.0001. This shows that the structured teaching program was effective in improving the practice of staff nurses regarding prevention of urinary tract infection in patients with indwelling catheter.

Keywords: Catheter associated Urinary Tract Infection (CAUTI), Effectiveness, Practice, Staff nurse

INTRODUCTION

Urinary tract infection represents one of the most common diseases encountered worldwide in medical practice today with more than 150 million UTIs per annum. Although UTI occur in both men and women, clinical studies suggest that the overall prevalence of UTI is more in women. Uncomplicated urinary tract infections in healthy women have an incidence of 50/1000/year. An estimated 50% of women experience at least one episode of UTI at some point in their lifetime and 20% - 40% of women have recurrent episodes. Approximately 20% of all UTIs occur in men. Most episodes of UTI are caused by E- coli (up to 85%) and Staphylococcus saprophyticus(up to 10%). Catheter associated urinary tract infection (CAUTI) are a major problem in hospitals inspite considerable spending on education and prevention. About 5,60,000 CAUTI are reported by Centre of disease control and prevention (CDC)every year. It has been estimated that more than 7 million people visits to emergency units and 100,000 hospitalization annually and accounts for 35% of nosocomial infection.

Urinary catheterization is a known cause of bacterial infections, which in the worst-case scenario can be fatal. More than 5 million patients every year is been catheterized. Up to 25 % of patients who are catheterized for more than 7 days will develop catheter associated urinary tract infection. It is the most common nosocomial infection, comprising more than 40 percent of all nosocomial infections.

To minimize the risk for introduction of microorganisms into the bladder, urinary catheters should only be inserted by well trained personnels.

Hand hygiene is the most important means of preventing infection and should be performed immediately before and after insertion of the catheter. The Investigator also felt during her clinical experience that many of the staff nurses posted in the medical surgical unit, uro-ward, and post operative wards failed to maintain proper aseptic technique while providing catheter care.
So the investigators felt that it is necessary to assess the practice of staff nurses regarding prevention of UTI in clients with indwelling catheter. Further the investigator felt that the written material must be supplied to staff nurses working in the medical surgical wards which will help them in preventing urinary tract infection in patients with indwelling catheter.

NEED FOR STUDY

A catheter is a tube placed in the bladder that excrete urine from the urinary tract. Because this tube stays in place for a long period of time, it is called an indwelling catheter. Catheterization is commonly done in critically ill and post operative patients. As the critically ill patients have less immunity they are highly prone to get nosocomial infections. Many hospitalized patients get UTI due to catheterization. These infections are often caused by *E- coli* and *Proteus mirabilis*. Individuals needing an indwelling catheter are predisposed to the development of CAUTIs due to the presence of an indwelling catheter and more likely pathogenic multidrug-resistant organisms in the hospital settings. Although the imminent threat of infection from these potent opportunistic nosocomial multiresistant strains, most cases of catheter-associated bacteria or the presence of bacteria in the urine are asymptomatic. However, if an episode of CAUTI becomes symptomatic, the resulting array can range from mild (fever, urethritis, and cystitis) to severe (acute pyelonephritis, renal scarring, calculus formation, and bacteremia).

A study was carried by Danbury hospital, USA to test a prevention bundle for catheter related urinary tract infections. They concluded that there are around 560,000 cases of catheter associated urinary tract infection per year. CAUTIs accounts for 23% of health care-associated infections in adult critical care units leading to complications such as cystitis, pyelonephriti, bacteremia, sepsis and increased risk of death. National rates for critical care have reached as high as 8.1 infections per 1000 catheters. Studies from around the world has shown that CAUTIs increase the costs of medical care morbidity and mortality.

The Indian journal of critical care medicine carried out a study to assess the knowledge and attitude of health care providers regarding the indications for catheterization and method of preventing CAUTI. They concluded that there is a tremendous scope of improvement in catheterization practices in the hospital settings and education induced intervention would be the most appropriate effort towards reducing the incidence of CAUTI.

A CAUTI occurs when a patient with an indwelling urinary catheter develops 2 or more signs or symptoms of UTI such as hematuria, fever, flank pain, change in the character of urine and altered mental status. Most hospitals do not have strict guidelines for the prevention of CAUTI. Training the health care personnel and introducing the prevention of CAUTI as a high priority in hospitals is strongly associated with decreased incidence of CAUTI. Many studies have shown that single most important modifiable risk factor for decreasing the incidence of CAUTI is reducing unnecessary catheter use.

Problem Statement:

A study to assess the effectiveness of structured teaching program on the practices of staff nurses regarding prevention of catheter associated urinary tract infection (CAUTI) among hospitalized patients in selected hospitals of Pune.

OBJECTIVES OF THE STUDY

To assess the practice of nurses regarding prevention of urinary tract infection in patients with indwelling catheter.

To assess the effectiveness of structured teaching program on the practices of nurses regarding prevention of urinary tract infection.

To find out the association of practice among nurses with selected demographic variables.

OPERATIONAL DEFINITION

1) Practices

According to oxford dictionary practices refers to "the actual application or use of an idea, belief, or method, as opposed to theories relating to it: ‘the principles and practice of teaching’ ‘the recommendations proved too expensive to put into practice”

In this study it refers to the method followed by the staff nurse in urinary catheterization.
2) Staff nurses

According to the Oxford dictionary “An experienced nurse less senior than a sister or charge nurse which helps the patient to restore to a healthy state”

In this study it refers to the staff nurses working in the medical surgical wards of the selected hospital in Pune.

3) Catheter associated urinary tract infection (CAUTI)

“A catheter urinary tract infection (CAUTI) is an infection involving any part of the urinary system, including urethra, bladder, ureters, and kidney in a patient associated with urinary catheter”

METHODOLOGY

An evaluative approach was adopted for the study to determine the effectiveness of structured teaching program on practice among staff nurses regarding prevention of urinary tract infection in patients with indwelling catheter. The present study is aimed at assessing the effectiveness of Structured Teaching Program on practice among staff nurses regarding prevention of urinary tract infection in patients with indwelling catheter in selected hospitals.

The design selected for the present study was Pre-experimental, one group pre-test–post-test design.

The setting of the present study was medical surgical wards of selected hospitals of Pune city. The population for the study was staff nurses working in the medical surgical wards of selected hospital.

Non-probability purposive sampling technique was used for the present study. The sample comprised of 60 staff nurses working in medical surgical wards of the selected hospital.

The data collection method used for the study was observational method to assess the practice related to prevention of urinary tract infection in patients with indwelling catheter. An observation checklist has been prepared as a tool to assess the practice of staff nurses regarding prevention of urinary tract infection in patients with indwelling catheter.

The study was divided into 3 phases.

PHASE 1: Pre-test i.e. assessing the existing practice of staff nurses regarding prevention of urinary tract infection in patients with indwelling Catheter through observational checklist.

PHASE 2: Structured Teaching program on practice regarding prevention of urinary tract Infection in patients with indwelling catheter.

PHASE 3: Post-test i.e. assessing the practice of staff nurses regarding prevention of urinary tract infection in patients with indwelling catheter.

Development of the tool

The tool for data collection had 2 sections – Section A and B

Section A: Demographic Proforma

This section consists of 5 items for the demographic proforma of the staff nurses regarding their age, gender, educational status, Years of experience and area of work.

Section B: Structured Observational Checklist:-

A structured observational checklist was used collect information regarding the practice of staff nurses on prevention of urinary tract infection in patients with indwelling catheter. This consists of 30 items. Each item was given a score of 1 and total score of the observational checklist was 30.

Arbitrary scoring of prevention of urinary tract infection practices

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Good</strong></td>
<td>20-30</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>10-19</td>
</tr>
<tr>
<td><strong>Poor</strong></td>
<td>0-9</td>
</tr>
</tbody>
</table>

Reliability of the tool

The reliability of the tool was calculated to be 0.90 for practice aspects. The co-efficient of equivalence was used to check the observational checklist by inter-rater reliability. Thus the tool was found to be reliable.

Method of data collection:

The pilot study was conducted to assess the feasibility of the study. The subjects of the pilot study were from selected hospital. Sixty staff nurses were selected using non-probability purposive sampling technique. The purpose and nature of the study was
explained to the authority to gain cooperation. Then the
consent was taken from the willing staff nurses from
medical surgical wards.

After obtaining the informed consent for study, on
the first day, a pre-test was obtained using observational
checklist. On the same day itself, a structured teaching
practice was done. The practice of catheterization was
after the intervention on the 2nd day.

**DATA ANALYSIS**

The data obtained was analysed by descriptive
and inferential statistics on the basis of objectives of
the study. To compute the data a master data sheet was
prepared.

**Section :1 Demographic proforma**

Data on demographic proforma was analysed by
frequency and percentage and is presented in tables and
figures.

**Section II: Practice on prevention of CAUTI**

The practice of staff nurses regarding the practice
on prevention of CAUTI, before and after administration
of intervention was analysed in terms of frequency,
percentage, mean, median, mean percentage and
standarded deviation and is presented in the form of tables
and diagram.

The significant difference between mean pre-test
and post-test scores are found out by t-test.

**Section III: Association between the practice
scores and selected demographic variables**

Association of practice scores of staff nurses
regarding age, years of experience, and educational
status are tested using Chi-square test.

**RESULTS AND INTERPRETATION**

**Section A: Description of the demographic
Variables of samples.**

**Table 1: Frequency and distribution of sample
according to demographic variable (n=60)**

<table>
<thead>
<tr>
<th>SNO</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>20-30</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>25</td>
<td>41.6</td>
</tr>
<tr>
<td></td>
<td>41-50</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>51-60</td>
<td>5</td>
<td>8.4</td>
</tr>
<tr>
<td>2</td>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GNM</td>
<td>40</td>
<td>66.6</td>
</tr>
<tr>
<td></td>
<td>BSC Nursing</td>
<td>20</td>
<td>33.33</td>
</tr>
<tr>
<td></td>
<td>MSC Nursing</td>
<td>nil</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Years of experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>less than 5</td>
<td>20</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>05 to 10 years</td>
<td>10</td>
<td>16.6</td>
</tr>
<tr>
<td></td>
<td>10 to 20 years</td>
<td>20</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>20 to 30 years</td>
<td>10</td>
<td>16.6</td>
</tr>
</tbody>
</table>

Table 1: shows that maximum percentage (41.6)
of subjects were from the age group of 31-40 years
wherein (8.4%) of them were in the age group of 51-60
years. Majority (66.6%) of subjects had GNM education,
33.33% had BSc/PBBSc Nursing and none of the
subjects had Msc Nursing education. 33.3 % of the
subjects had equal percentage of year of experience ie.
less than 5, and 10-20 years of experience respectively.
Remaining 16.6% of the subjects had 20-30 years of
total experience.

**Section B: Level of practice of staff nurses on
prevention of CAUTI**

Practice of 60 staff nurses was assessed by using
observational checklist and analysed by descriptive
statistics as presented in table 2.
The data presented in table 2 shows that in pre-test majority (48.33%) of the staff nurses had average practice, 45% of staff nurses had poor practice and 6.6% had good practice on prevention of CAUTI.

In post-test (70%) of staff nurses had average practice and 30% had good practice whereas none of the staff nurses had poor practice on prevention of CAUTI.

Table 3: Mean, Median, standard Deviation and mean percentage and t’- value of pre-test and post-test practice scores

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Mean percent</th>
<th>Mean difference of pre-test and post-test</th>
<th>t test value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>10.4</td>
<td>4.39</td>
<td>34.66</td>
<td>8.16</td>
<td>12.76</td>
</tr>
<tr>
<td>Post-test</td>
<td>18.56</td>
<td>3.88</td>
<td>61.86</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data in the table 3 shows that the mean practice score in the post-test was (18.56±3.88) was higher that the mean pre-test practice score(10.4±4.39), which is highly significant as p value <0.0001. This shows that the structured teaching program was effective in improving the practice of staff nurses regarding prevention of urinary tract infection in patients with indwelling catheter.

Section C: Association between pre-test practice score and demographic proforma

There were no significant difference in the pre-test knowledge score with selected demographic variables such as age, and year of experience, educational status

DISCUSSIONS

In this study the seriousness of CAUTIs in the hospitalised patients, decreasing the CAUTI rate by 50% was a tremendous leap forward in the study and this effort helped to minimize the CAUTI rate and increased the practice of staff nurses. This study also provided standardization in nursing practice when caring for patients with urinary catheters. The bedside checklist and interventions provided further consistency in care as a reminder to staff to perform all aspects of CAUTI prevention. Limitations in this study included lack of randomization for group assignments. For ethical reasons, standard catheter care could not be withheld in the patients, thus eliminating the possibility of a true control group for this study. Further, it would not be feasible from a nursing work-flow perspective to effectively sort the patient assignments based on bundled versus non-bundled catheter care to form a control group. Finally, results were collected on adult patients in medical surgical units and as such, results are not generalizable to pediatric patients. During the pre-intervention time period, patients with indwelling catheters were cleansed daily with chlorhexidine wipes. This may have also had a positive impact in reducing CAUTIs, although the chlorhexidine wipes were never used on mucosal areas such as the perineum/meatus.

CONCLUSION

The findings of the study show that there is a highly significant difference between the pre-test and post-test practice scores of the group. The Structured Teaching program significantly brought out an improvement in the practice aspect among nurses working in medical surgical wards regarding prevention of urinary tract infection in patients with indwelling catheters. There is no significant association between practice scores with the selected demographic variables like age, educational status, years of experience and as p value >0.05. The study could help in increasing the practice among staff nurses regarding prevention of urinary tract infection in patients with indwelling catheters.

Ethical Clearance: It is been taken from Research Advisory Committee(RAC), Symbiosis College of Nursing.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


Smoked Tobacco Prevalence, Knowledge of Hazards and Motivation to Quit among Smokers in Suburban Mumbai

Tyagi Rahul¹, Hande Vivek², Singhal Anuj³

¹MD (Pulmonary Medicine), Department of Medicine, INHS Asvini, Mumbai, ²Prof and HOD (Medicine and Gastroenterology), Department of Medicine INHS Asvini, Mumbai, ³Assoc Prof (Medicine), Department of Medicine, AFMC

ABSTRACT

Background: Tobacco use related illness are common cause of premature deaths globally. WHO and CDC in 2011 estimated that 5 million deaths occur due to smoking related illness globally and projected an increase to eight million in the estimated figure by 2030. Community outreach medical camps are conducted by various organizations across country and provide an unique opportunity to study the individuals attending these camps regarding their health related behaviour and knowledge. The current study was designed to study the smoking prevalence and knowledge of hazards of smoking and the motivation to quit of individuals attending community outreach medical camps.

Method: It was a cross sectional descriptive study conducted at the various outreach camps held by a tertiary care hospital in Mumbai. Camps were held between Sep 2015 and Mar 2016. 302 person attending these outreach camps were interviewed. 86 current daily smokers were included in the study. Data was collected using questions recommended by Global Adult Tobacco Survey (GATS) Collaborative group. In person interviewer conducted interviews based on adapted GATS were administered during the outreach camps by the principal investigator. Only current tobacco users were included in the study and tobacco smoking pattern was assessed by asking about their current smoking status, age of initiation, the type of smoking product used ( bidi/cigarette) , the number of products smoked daily. Smoking Cessation was assessed by their motivation to quit smoking. Second hand smoke harm awareness was assessed by asking about knowledge of harmful effect of second hand smoke in non smokers. Awareness about dangers of smoking, and means to quit smoking were also assessed

Results: Among the study population preferred means of smoking tobacco was via cigarette (n=48;57.1%) while rest of subjects smoked bidi (n=36;42.9%). Majority of study subjects were mild smokers with smoking index < 100 (n=35;41.7%), while moderate smokers (n=29;34.5%) and heavy smokers (n=20;23.8%) also formed a sizeable chunk of the study population.

23 subjects (27.38%) had no knowledge about smoking related illness. Majority of those interviewed knew that smoking can result in Cancer( n=50; 59.5%). When asked about weather smoking results in harm to family members 26 subjects (31%) did not have the knowledge of smoking causing harm to family members. There was significantly more subjects with knowledge of harm to family members (p=0.010) and knowledge of means to quit smoking (p<0.001) in Middle SES group. However the motivation to quit smoking across two groups was not significantly different (p=0.010)

Conclusion: Although awareness among smoking related illness is increasing there is need to concentrate on campaigns which make people aware of other ill effects of smoking and make them aware of supportive measures available to quit smoking

Keywords: Smoking, Environmetal Tobacco Smoke, Cancer, Smoking index, Socio Economic Status

INTRODUCTION

Tobacco use related illness are common cause of premature deaths globally.¹ WHO and CDC in 2011 estimated that 5 million deaths occur due to smoking
relate illness globally and projected an increase to eight million in the estimated figure by 2030. The estimates are equally dismal in India with WHO projecting tobacco related deaths to be responsible for 13.3% of all deaths in our country by 2020. Smoking related mortality is particularly worrisome due to various peculiarities like being preventable, majority of deaths occurring in productive age group, it resulting in an increase in tuberculosis which is a significant health problem in our country and the rising prevalence of tobacco use in developing country like India. WHO recognises tobacco use as an epidemic and emphasizes that systemic surveillance is essential to monitor the epidemic. Global Adult Tobacco Survey (GATS) was developed to provide a standard protocol for monitoring of adult tobacco use globally. GATS India in 2010 reported tobacco consumption among more than one third adults in India. There are inequalities in tobacco consumption across age, sex, states and Socio Economic Status (SES). Community outreach medical camps are conducted by various organizations across country and provide an unique opportunity to study the individuals attending these camps regarding their health related behaviour and knowledge. The current study was designed to study the smoking prevalence and knowledge of hazards of smoking and the motivation to quit of individuals attending community outreach medical camps.

AIMS & OBJECTIVES

Assessment of prevalence of smoking among individuals attending community outreach medical camps in suburban Mumbai.

Assessment of knowledge of ill effects of smoking on self and family in this cohort

Assessment of knowledge of means of smoking cessation in this cohort

METHODOLOGY

Study design

It was a cross sectional descriptive study conducted at the various outreach camps held by a tertiary care hospital in Mumbai. Camps were held between Sep 2015 and Mar 2016. 302 person attending these outreach camps were interviewed. 86 current daily smokers were included in the study.

Inclusion criterion

All adult male and female attending medical camp and willing to participate in the study were included

Exclusion Criterion

Individuals who were not willing to participate were excluded.

METHODOLOGY

Data was collected using questions recommended by Global Adult Tobacco Survey (GATS) Collaborative group. GATS questionnaire adapted keeping in mind the aims and objectives of our study. In person interviewer conducted interviews based on adapted GATS were administered during the outreach camps by the principal investigator. Background questions included age, sex, education and profession. Only current tobacco users were included in the study and tobacco smoking pattern was assessed by asking about their current smoking status, age of initiation, the type of smoking product used (bidi/cigarette), the number of products smoked daily. Smoking Cessation was assessed by their motivation to quit smoking. Second hand smoke harm awareness was assessed by asking about knowledge of harmful effect of second hand smoke in non smokers. Awareness about dangers of smoking, and means to quit smoking were also assessed.

RESULTS

302 individual were interviewed during the outreach camps conducted in areas of suburban Mumbai. 84 individuals who were actively smoking at the time of study were included. All study subjects were male. Demographic characteristics of study population are given in Table 1. Age distribution of subjects was as in Fig 1. Maximum subjects were in the age group 41-50 yrs.

Table 1 : Demographic Characteristics of Study Population

<table>
<thead>
<tr>
<th>S No</th>
<th>Study Population Parameter</th>
<th>Number</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age Distribution of Study population (in yrs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 30</td>
<td>9</td>
<td>10.7</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>20</td>
<td>23.8</td>
</tr>
<tr>
<td></td>
<td>41-50</td>
<td>23</td>
<td>27.4</td>
</tr>
<tr>
<td></td>
<td>51-60</td>
<td>19</td>
<td>22.6</td>
</tr>
</tbody>
</table>
The literacy status of the study subjects is depicted in Fig 2. More than 50% of the study subjects had an education up to middle school or less.

The smoking characteristics of study population were as given in Table 2

Table 2: Smoking Characteristics of Study Population

<table>
<thead>
<tr>
<th>S No</th>
<th>Smoking Characteristic of Study Population</th>
<th>Number of Subjects</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age of starting smoking (in yrs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 15</td>
<td>12</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>16 - 20</td>
<td>15</td>
<td>17.9</td>
</tr>
<tr>
<td></td>
<td>21 - 25</td>
<td>12</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>26 - 30</td>
<td>16</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>31 - 35</td>
<td>13</td>
<td>15.5</td>
</tr>
<tr>
<td></td>
<td>36 - 40</td>
<td>8</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>&gt; 40</td>
<td>8</td>
<td>9.5</td>
</tr>
<tr>
<td>2</td>
<td>Duration of Smoking among Study Subjects (in yrs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 5</td>
<td>17</td>
<td>20.2</td>
</tr>
<tr>
<td></td>
<td>6 - 10 years</td>
<td>20</td>
<td>23.8</td>
</tr>
<tr>
<td></td>
<td>11 - 15 years</td>
<td>7</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>16 - 20 years</td>
<td>16</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>&gt; 20 years</td>
<td>24</td>
<td>28.6</td>
</tr>
<tr>
<td>3</td>
<td>Tobacco smoked in form of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bidi</td>
<td>36</td>
<td>42.9</td>
</tr>
</tbody>
</table>
Table 3: Cross tabulation of smoking index (SI) with education levels

<table>
<thead>
<tr>
<th>S No.</th>
<th>Education Level</th>
<th>Mild Smoker</th>
<th>Moderate Smoker</th>
<th>Heavy Smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Illiterate</td>
<td>3</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>Primary</td>
<td>6</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Middle</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Secondary</td>
<td>5</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Higher secondary</td>
<td>11</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Graduate</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>PG</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Participants in the study were from Lower (n=57; 67.8%) or Middle (n=27; 32.2%) socioeconomic group according to Kuppuswamy Socioeconomic Scale (SES). Crosstabulation of SES and smoking index revealed a significantly more smoking exposure in Lower SES group (p<0.001)

Table 4: Crosstabulation of smoking index (SI) with SES

<table>
<thead>
<tr>
<th>S No</th>
<th>SES</th>
<th>SI &lt; 100</th>
<th>SI 100-300</th>
<th>SI &gt;300</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lower</td>
<td>16</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Middle</td>
<td>19</td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

The subjects were asked if they were motivated to quit smoking. 73 of those interviewed (86.9%) were motivated to quit. However a crosstabulation of smoking index in those motivated to quit smoking did not reveal a significant difference (p=0.056) in the motivation between mild, moderate and heavy smokers. (Table 5)

Table 5: Crosstabulation of Motivation to quit smoking with SI in the study group

<table>
<thead>
<tr>
<th>S No</th>
<th>Motivated to quit</th>
<th>SI &lt;100</th>
<th>SI 100-300</th>
<th>SI &gt;300</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>32</td>
<td>27</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

The knowledge of study subjects regarding smoking related harm to family members, their motivation to quit smoking and knowledge of means to quit smoking in various socioeconomic groups were compared. (Table 6) There was significantly more subjects with knowledge of harm to family members (p=0.010) and knowledge of means to quit smoking (p<0.001) in Middle SES group. However the motivation to quit smoking across two groups was not significantly different (p=0.010)

Table 6: Motivation to quit, knowledge of smoking related harm to family and knowledge of means to quit in various socioeconomic groups among study subjects.

<table>
<thead>
<tr>
<th>S No</th>
<th>Parameter</th>
<th>Lower SES</th>
<th>Middle SES</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motivation to Quit Smoking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>47</td>
<td>26</td>
<td>0.096</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of Harm to Family</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>34</td>
<td>24</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>23</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Knowledge of means to quit smoking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>7</td>
<td>17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>50</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

Smoking prevalence in our study population was 27.8%. In a study done by Garg et al.⁵ among residents of resettlement colony in Delhi the prevalence was found to be 24.6%. This population had a similar socioeconomic profile to our study population with majority belonging to lower and middle class. In various studies lower rates of smoking among females have been reported.⁵,⁹,¹⁰,¹¹ the various reason for lower female smoking can be due to lesser numbers picking up the habit due to social unacceptability and lesser numbers coming out to admit that they smoke. As we studied self reported smoking rates possibility of underreporting by female subjects can account for absence of females in our study population. In our study majority were cigarette smokers. Fu SH et all studied geospatial differences in smoking in India. They found that cigarette and bidi had distinct geospatial patterns which could explain the difference in smoking habit of our study population compared to study population of Garg et al. Majority of study subjects had started smoking before age of 30 yrs. In various studies average age of initiation of tobacco has been reported as 16.5 yrs⁶ to 20.87 yrs⁷. Since majority of our study subjects had started smoking at an early age the duration of smoking was more than 10 yrs and Smoking Index was more than 100 in majority. Although 59% of our study population could name at least one disease caused by smoking the knowledge of smoking related illness other than cancer was dismal and 27% subjects could not name even a single disease caused by smoking. The awareness about smoking causing cancer can be attributed to mass awareness campaigns launched by the government including warnings on packets of tobacco products which are mostly concentrated around cancer. In our study there was a significant correlation between education level and degree of smoking. Smoking index was significantly higher in subjects with lower education. In study done by Zhu et al they found that likelihood of smoking decreased and that of smoking cessation increased with each successive year of smoking. This is consistent with our finding of significantly higher smoking index in subjects with lower education levels. Although knowledge of harm to family members and knowledge of means to quit smoking was more in subjects in Middle SES group, the motivation to quit did not significantly vary among two groups. This can be attributed to the motivation to quit also being dependent on knowledge of self harm( 59% of our study subject had knowledge of atleast one disease cause due to cancer) . The motivation to quit in our study was self reported and subjects may have over-reported their motivation to quit.

CONCLUSION

Although awareness among smoking related illness is increasing there is need to concentrate on campaigns which make people aware of other ill effects of smoking and make them aware of supportive measures available to quit smoking.

Ethical Clearance for the study was taken from institutional ethics committee of the hospital

Conflict of Interest : Nil

Funding Information: Nil

REFERENCES


Menstrual Gymnastics on Beta Endorphins Hormone Levels and Intensity of Pain in Premenstrual Syndrome

Sri Sumarni¹, Nur Khafidhoh¹, Umaroh¹, Munayaroch², Ismi Rajiani³

¹Assistant Professor, ²Associate Professor, Politeknik Kesehatan Kementrian Kesehatan Semarang, Indonesia, ³Deputy to Chairman, STIAMAK Barunawati, Surabaya, Indonesia

ABSTRACT

Background: Prevalence of premenstrual syndrome (PMS) affecting the decrease in work productivity, learning quality, and daily activities is still high among women. The purpose of this study is to identify the effect of menstrual gymnastics on beta endorphins hormone levels and the intensity of pain during PSM after treated with menstrual gymnastics.

Method: This study was an experimental study with a pre-test and post-test control group design. The samples consist of 25 subjects in the intervention group and 16 subjects in the control group. The intervention was menstrual exercise performed for 45 minutes every day for 5 consecutive days during the lutheal phase of a woman. Data of hormonal beta hormone level was analyzed with dependent t test and pain intensity data was analyzed by Wilcoxon test. Effect of menstrual gymnastics on hormonal level of beta endorphin and pain intensity at post test of treatment group and post test of control group were performed with independent t test.

Results: Menstrual gymnastics affect hormonal content of beta endorphin in treatment group with p-value = 0.002. Menstrual gymnastics also influence the intensity of pain with p-value = 0.001 in treatment group during pre test and post test. However, menstrual gymnastics do not affect the endorphin beta hormone level and pain intensity in control group during pre test and post test. There is a significant difference of beta hormone levels between post treatment group and post test in control group with p value = 0.036. There is no significant difference of pain intensity between post-treatment group and post test in control group with p = 0.512.

Conclusion: Menstrual gymnastics need to be implemented to reduce premenstrual syndrome cases. However, further research is needed on other variables that may affect and effectiveness of menstrual gymnastics on premenstrual syndrome.

Keywords - beta endorphins hormone, pain, menstrual gymnastics, premenstrual syndrome

INTRODUCTION

The process of menstruation is a periodic and cyclic blood discharge from the uterus with the release of the vaginal mucous membrane (endometrium) in the woman. Any healthy woman who is not pregnant and not yet menopausal will get menstruation on a monthly basis¹. Menstruation is normal but in reality many women experience menstrual pain².

Premenstrual syndrome is a set of symptoms that appear before menstruation related to the menstrual cycle that occurs in women of reproductive age³. The exact cause of premenstrual syndrome is uncertain, but there are many underlying theories. Some of the factors causing premenstrual syndrome are related to biologic and hormonal changes⁴. The phenomenon of PMS cases is on the rise and is felt disturbing by many productive women as both students and workers⁵. At
least 80% of reproductive age women in the United States experienced at least one or more symptoms of premenstrual syndrome (6), (7).

The criteria for the diagnosis of premenstrual syndrome include eleven signs and symptoms of feeling depressed / hopeless / sensitive, anxiety / tension / cornered, unstable affective (sudden feeling of sudden sadness, increased sensitivity / self-rejection) (8).

The PMS is significantly related to the increase for direct medical costs that include outpatients, laboratory tests, and radiology. In addition there is an increase in cost and decreased productivity and abandoned working hours equivalent to 3-16% of work productivity (9), (10).

PMS handling is done pharmacologically, psychologically, dietary diet, exercise, and/or herbal treatment. Selective Serotonin Reuptake Inhibitors (SSRIs) proved effective in the management of PMS cases (11) and provision of vitamin B6 as a cofactor in serotonin synthesis may be influential (12), (13). Furthermore, Tibolone administration, synthesis of steroids, may increase plasma beta endorphin hormone in PMS (14). However, very little research is concerned with the effectiveness of such treatment. PMS usually begins in adolescence to menopause. PMS contributes to an increase in cases of postpartum depression (15).

Pharmacologically, the treatment uses sedative or analgesic medications such as aspirin or by giving anti prostaglandin hormones to reduce the strength of uterine contractions (16). Non pharmacologically, the cure is performed with alternative medication (massage, vibrator, warm and cold compress) and cognitive behavior (relaxation and distraction) (17). Besides, non pharmacological handling of PMS is done by modifying the behavior including modified diet and food supplementation, relaxation, and sports programs. Dietary modifications include control of intake of caffeine, alcohol, salt, carbohydrates, and non-refined sugars (18). The more physical activity decreases the symptoms of PMS. However, it needs further research and a lot of scientific evidence related to sports to reduce symptoms of PMS (19). Several studies have revealed the frequent use of pharmacological drugs can cause side effects. Pharmacologic drugs work to inhibit the synthetic prostaglandins and work on peripheral nerve receptors to reduce transmission and pain relief receptions. The reaction of pharmacologic drugs ranges from approximately four hours after which the pain will arise again (20). As such, there should be an alternative way in the management of PMS. The purpose of this study is to determine the effect of menstrual gymnastics on endorphin beta hormone levels - neuropeptides involved in pain management, possessing morphine like effects and pain intensity in premenstrual syndrome cases.

**METHODOLOGY**

This study was an experimental study, with a pre-test / post-test control group design. The population is 415 medical students in Semarang, Indonesia. Inclusion criteria included those who were in menstrual regularity and premenstrual syndrome screened for three months and obtained 132 people. After consent was approved, and the number of samples was calculated with Slovin formula (21) generating 56 subjects. Subjects were divided into 28 persons and 28 controls. During the treatment, three people dropped out of the treatment group and 12 from the control group. Subjects participating until completion of the study and analyzed as many as 25 subjects in the intervention group and 16 subjects in the control group. Measurement of pain intensity applied Numerical Rating Scale (NRS) developed by Ferreira-Valente (2011) for it is an instrument of measuring pain intensity that has the highest validity and reliability.

The data of normal beta endorphins hormone levels were analyzed with dependent t test. The data of abnormal pain intensity was performed with Wilcoxon test. The effect of menstrual gymnastic on hormonal level of beta endorphins and pain intensity in post test of treatment group and control group employed independent t test.

**RESULTS**

The distribution of pre-test and post-test data of the endorphins beta hormone levels and pain intensity in the treatment and control group is listed below.
Table 1: Mean hormone levels of beta endorphins and pain intensity

<table>
<thead>
<tr>
<th>Description</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre test</td>
<td>Post test</td>
</tr>
<tr>
<td>Beta endorphin hormone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>197.02</td>
<td>234.28</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>95.62</td>
<td>132.81</td>
</tr>
<tr>
<td>Pain intensity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>5.84</td>
<td>1.58</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>2.15</td>
<td>2.20</td>
</tr>
</tbody>
</table>

The average beta endorphins hormone levels increased in the pretest treatment group from 197.02 to 234.28 at the time of post test. Standard deviation of endorphin beta hormone levels increased in the treatment groups from 95.62 to  132.81 at the time of posttest. The mean of endorphin beta hormone level decreased from 371.69 when pretest to 366.25 during post test in the group. Standard deviation of hormone levels of beta endorphins in control group increased from 191.25 at pretest and 223.91 at post test.

The mean pain intensity decreased by 4.26 in the pretest treatment group from 5.84 to 1.58 at the time of posttest. Standard deviation of pain intensity level was 2.15 at pretest and 2.20 at post test. The mean of pain intensity level also decreased slightly from 3.75 when pretest to 2.19 during post test in the control group. Standard deviation of pain intensity level decreased in pretest control group from 2.082 to 1.64 at post test.

Table 2: Differences of hormonal levels of beta endorphins and intensity of pre test and post test pain in treatment and control group

<table>
<thead>
<tr>
<th>Variables</th>
<th>F</th>
<th>(Min-Max)</th>
<th>Mean</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment group : Beta Endorphin hormone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>25</td>
<td>(101.76-507.22)</td>
<td>197.02</td>
<td>0.002</td>
</tr>
<tr>
<td>Post test</td>
<td>25</td>
<td>(80.56-655.69)</td>
<td>234.29</td>
<td></td>
</tr>
<tr>
<td>Pain intensity</td>
<td></td>
<td></td>
<td></td>
<td>0.001</td>
</tr>
<tr>
<td>Pretest</td>
<td>25</td>
<td>(2-9)</td>
<td>5.84</td>
<td></td>
</tr>
<tr>
<td>Post test</td>
<td>25</td>
<td>(0-6)</td>
<td>1.76</td>
<td></td>
</tr>
<tr>
<td>Control group : Beta Endorphin hormone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>16</td>
<td>102.62-734.23</td>
<td>371.69</td>
<td>0.889</td>
</tr>
<tr>
<td>Post test</td>
<td>16</td>
<td>52.19-825.99</td>
<td>366.25</td>
<td></td>
</tr>
<tr>
<td>Pain intensity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>16</td>
<td>1-8</td>
<td>3.75</td>
<td>0.059</td>
</tr>
<tr>
<td>Post test</td>
<td>16</td>
<td>0-5</td>
<td>2.19</td>
<td></td>
</tr>
</tbody>
</table>
The result of pre test and post test of beta endorphin hormone treatment showed that p-value was equal to 0.002 indicating the influence of menstrual gymnastics on endorphin beta hormone level. Likewise, there found the influence of menstrual gymnastics on pain intensity in pretest as well as post test treatment group shown with p-value = 0.001.

The result of pre test and post test of beta endorphin hormone level as indicated by the p-value = 0.889. Likewise, there was no effect of menstrual gymnastics on pain intensity in pretest post test in control group as shown by p-value = 0.059.

Table 3: Differences in levels of the beta Endorphin hormone and intensity of pain in the treatment group with post test in the control group

<table>
<thead>
<tr>
<th>Variables</th>
<th>f</th>
<th>Lower</th>
<th>Upper</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post test levels of the beta endorphin hormone in treatment group</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post test levels of the beta endorphin hormone in control group</td>
<td>16</td>
<td>10.67</td>
<td>274.4</td>
<td>0.036</td>
</tr>
<tr>
<td>Post test level of pain intensity in treatment group</td>
<td>25</td>
<td>-0.95</td>
<td>1.82</td>
<td></td>
</tr>
<tr>
<td>Post test level of pain intensity in control group</td>
<td>16</td>
<td></td>
<td></td>
<td>0.512</td>
</tr>
</tbody>
</table>

The above table shows that there was a significant difference of beta endorphins hormone levels between after menstrual gymnastics in treatment group with after menstrual gymnast on control group with p-value = 0.036. Menstrual gymnastic treatment proved to increase beta endorphin hormone levels. Contrary, there was no significant difference of pain intensity between post-treatment group and post test in control group with p = 0.512. Though statistically there was no effect but the average value of pain intensity decreased from the average of 3.75 to 2.19.

**DISCUSSION**

Menstrual gymnastic played a role in increasing levels of the beta endorphin hormone and decreased pain intensity in premenstrual syndrome. Premenstrual syndrome cases might occur in women of all ages regardless of the time.(7) The levels of endorphin hormone in an individual differed according to the sensitivity of a person to the stimulation of endorphin hormone release (23). In addition, the individual habits in exercising also affected the high levels of the hormone (24). The results of this study found an increase in average levels of the hormones prior to menstrual gymnastics and after menstrual gymnastics were performed. This indicates that the implementation of menstrual gymnastics was effective in increasing the levels of the endorphins hormone.

When people exercise, the body releases endorphins interacting with the receptors in the brain that reduce the perception of pain. A study of at least 9 minutes of exercise can reduce stress and anxiety. The optimum time for the sport is for 30 minutes and is performed for five consecutive days (25). In this study, the implementation of exercise performed in a duration of forty five minutes each and for five consecutive days. The results of the study showed a decrease in pain intensity of 4.26 from the average pain intensity of 5.84 at the pre test to 1.58 at the time of post test.

A study concluded that exercise by using music for ten minutes resulted in elevated levels of the beta endorphins hormone compared to sports that did not use music(26). In this study, menstrual gymnastics used music for approximately 45 minutes. The results showed an increase in average levels of beta endorphins hormone in the treatment group but decreased in the control group. The results of this study indicated that there was the influence of menstrual gymnastics on endorphin hormone levels in the treatment group given menstrual gymnastic for five consecutive days. This suggests that consistency in exercise should become the concern in managing the PMS cases both in frequency and portion as previous research results conveyed that excessive exercise might become immuno depressor against endurance. When the oxygen needs in the body was excessive, this will spur free radicals in the body to become toxic in the body’s metabolic processes(27).

Statistically, there was no effect of menstrual gymnastics on pain intensity on post test treatment group with post test in control group. Biologically, however,
there was a change that was shown by differences in the level of endorphin biomarker hormone in treatment group and post-test control group. The difference in the intensity of the insignificant pain was probably attributable to data collection at the time of pretest in the control group how someone perceived the pain as it was very subjective. Individuals may experience different pain even with pain from the same source (28). In addition, the treatment of gymnastics by music may increase the feeling of happiness depending on the rhythm of the music. This is in accordance with research where there were differences in research results in people who follow aerobics with no music, with slow music and with loud music (26). From the above results it was possible that happy feelings would affect the hormonal levels in the human body (28).

CONCLUSION

Menstrual gymnastics affected the levels of beta endorphin hormone as well as the intensity of pain in treatment group. Contrary, menstrual gymnastics did not effect both endorphin hormone levels and intensity of pain in pre test and post test of the control group. There was a significant difference in endorphin hormone levels between the groups treated with menstrual gymnastics with those who were not given the treatment. However, there was no significant difference of pain intensity between the groups treated with menstrual gymnastics with those who were not given the treatment.

Ethical Clearance: The research received permission of ethical clearance from the Health Research Ethics Committee of Poltekkes Kemenkes Semarang number 044 / KEPK / Poltekkes-Smg / EC / 2015 on September 25, 2015. The authors would like thank the subject, gymnastics instructor, enumerator and laboratory of Diponegoro University who have facilitated the research.

Conflict of Interest: The authors have no conflict of interests pertaining to the activity and coverage of this research.

Source of Funding: The study was supported by Health Polytechnic of Indonesia Ministry of Health.

REFERENCES

12. Wyatt KM, Dimmock PW, Jones PW. Efficacy of vitamin B6 in the treatment of premenstrual


Streamlining Laboratory Work Flow Using Lean Concepts: An Exploratory Study

Shweta R Naik¹, G V Khyathi², A C Lokesh³
¹Postgraduate Student, ²Assistant Professor, Department of Hospital Administration, ³Associate Professor, Department of Management Studies, Ramaiah University of Applied Sciences, Bangalore, Karnataka, India

ABSTRACT

Quality has gained highest level of importance in every sector of business including healthcare industry. Due to its complex nature, quality care with long-term strategies for continuous quality improvement plays a vital role. To achieve desired level of quality, the work process needs to be streamlined by adopting tools and models that emphasize on value-added activities. It is a cross-sectional study, exploratory in nature carried out for a period of six months in a tertiary care teaching hospital. The study focused on Value-Stream Mapping (VSM) and calculation of Turn-Around Time (TAT), TAKT time for the laboratory workflow to identify gaps and non-value added activities. This study aims to eliminate non-value added steps in the work process. The data analysis was carried out by using Quality control tools such as histogram and Fish-bone diagram. As a result of data analysis, it can be concluded that Essential non-value added steps and Non-Essential non-value added steps are 17.4 minutes and 26.76 minutes, 20.4 minutes and 26.93 minutes for Biochemistry specimens and Pathology/Hematology specimens respectively. Therefore, a revised value-added laboratory workflow was framed and recommendations are provided that emphasize the utilization of the existing resources and to adopt innovative technologies to reduce TAT and delays.

Keywords: Health care industry, laboratory workflow, turnaround time, TAKT Time, Lean concept

INTRODUCTION

Streamlining of the workflow has taken its importance across the globe to improve the quality of care. The value-added work process eliminates the non-value added activities saving time and resources thus benefitting the health care providers and customers. The core purpose of the study is to introduce lean concept and its incorporation in healthcare industry especially the workflow process of a clinical laboratory, the importance, and challenges of workflow process in the clinical laboratory.

Lean Concept

Lean was originally derived from the Toyota Car Manufacturing Company that emphasized on continuous improvement process consisting of structured inventory management system, reduction in waste and various techniques involved in quality improvement process. Lean tools aims to change the organization thinking and value that ultimately leads to the cultural and behavioral transformation of every employee of an organization focusing efficient use of the resources [¹].

Lean in Healthcare

Globally, there is increasing concern of providing high quality patient care with minimal or zero adverse events, wastes and waits. Lean thinking is based on the principles that drive ‘customer value’ and ‘removal of waste’. Hence, Lean concepts add value to the customer need and assist an organization to move towards achieving these goals using lean models. Lean in healthcare is defined as “a set of philosophies and methods that help create a maximum value for patients by reducing waste and waits”[¹]. Several techniques are adopted in different countries, namely Kaizen (continuous improvement cycle), 5S (Sort, Straighten, Shine, Standardize and Sustain), Lean 3Ps (Production Preparation Process), TAKT Time, Kanban, Rapid Process Improvement Workshops (RPIW) and Value Stream Mapping (VSM) to achieve positive outcome in health system, patients and/or families and the healthcare providers[¹].

DOI Number: 10.5958/0976-5506.2018.00528.4
According to John Moraros (2016), reviewed literature in the healthcare setting solely deal with Lean healthcare and its outcome. Author concludes that, though Lean model leads to desired improvement in the healthcare but there are other variables contributing to positive healthcare impact with minimal contribution from Lean methodologies due to complex nature of the healthcare industry [2].

The relationship of implementing Lean methodologies and its success in healthcare industry is still at the discussion platform all over the globe. From the above literature study, it appears that the success of Lean methodology as one of the contributing variable to deliver a high quality patient care with desired outcome, elimination of waste and errors need to be quantified with more studies.

**Work Flow Process in Laboratory**

A workflow is defined as “a pre-defined set of work steps and partial ordering of these steps.” The staffs mostly carry out those steps as they are expected to execute their responsibility in the approved process pattern[3]. Some of the challenges that need to be addressed while designing and/or redesigning the laboratory workflow process in the health care settings are [4]:

- Reducing waste such as samples, reagents and working hours
- Conserving energy by improving sample accuracy (doing it right first time)
- Reducing turnaround times
- Allocating laboratory staff and resources efficiently
- Timely reporting of the laboratory results
- Reduction in unnecessary staff movement

**Turnaround Time (TAT)**

Lundberg described TAT as “Brain to Brain TAT or Total testing cycle. The entire process is divided into nine smaller steps such as ordering, collection, identification, transportation, separation, analysis, reporting, interpretation and action”[5]. TAT can be broadly classified as pre-analytic (from test ordering until specimen reaches accession room), analytic (from sample receiving at laboratory to result validation) and post-analytic phase (from result validation until physician sees the result)[6].

**LITERATURE REVIEW**

There are studies conducted in different departments of the hospital worldwide with positive outcome using Lean concept. It is been observed that there is always delay and/or error in the process of laboratory sample investigations with unsaid cause.

Bernhard Breil (2011), states that after analyzing various literature review, it is not an easy task to define the healthcare process but it is important to know the definition of time intervals in terms of TAT (Turn-around time) as it plays a role of important indicator. Hawkins (2007), published a paper that reveals the stages of the laboratory work process that extends from ordering to interpretation and action[7]. In a study conducted at Asan Medical Center’s Clinical Laboratory for a time period from 30 July 2007 to 26 August 2007 to calculate Turnaround time in three phases and identify the delay contributing area. The result showed that average TAT at pre-analytical, analytical and post-analytical phase were 29.4±6.1 min, 13.7±3 min and 0.02±0.13 min respectively. This accounts to 68.2% (pre-analytical), 31.8% (analytical) and 0.05% (post-analytical phase) of time taken for the process. The root cause for the prolonged pre-analytical and analytic phase was waiting time for phlebotomy and analysis of specimen due to repeated tests [8].

A descriptive, cross-sectional study, “Root Cause Analysis (RCA) of Prolonged Laboratory Turnaround Time in a Tertiary Care Set up” was conducted with 100 samples and aimed to identify cause of increased TAT and formulate the measures to reduce the same for CBC and Urine routine investigations. The samples were grouped into ten of five groups and the data analysis revealed that time interval of study group was significantly high (p<0.05) within a 95% confidence interval of the difference. It was identified that the time interval between laboratory test order and study group reaching the central laboratory was high. Hence, suggestions such as creating sample collection booth at IPD and OPD, Route map on OPD ticket to reach central laboratory, designated report delivery desk, and electronic test order software was given to reduce TAT[9].

A study “Turnaround Time (TAT) as a Benchmark of Laboratory Performance” was conducted in a Tertiary
care super specialty center, Delhi. From the collected data, it was analyzed that average TAT for the routine biochemistries was 5.5 hours and 24 hours for inpatient and OPD respectively. For Prothrombin time average TAT was 30 minutes whereas stat samples including electrolytes resulted in TAT of 1 hour. It was also found that 76.25% of average TAT was identified at the pre and post-analytical phase suggesting immediate intervention. To reduce the TAT at pre-analytic phase, the author suggested on installation of pneumatic tubing system and other automated process at phlebotomy. Another suggestion to reduce TAT at post-analytic phase was the effective division of work among technician in the laboratory [10].

A comparative study “The combined positive impact of Lean methodology and Ventana Symphony autostainer on histology lab workflow,” conducted with the aim to reduce TAT. The core-studied area for improvement included total TAT of the specimen, impact on productivity, staff motion and specimen transportation. The data was analyzed using two-tail t-test method that showed normal Gaussian distribution. During the study, difference in the productivity was negligible but after the implementation of lean methodologies such as redesigning of the laboratory space, reframing the work process eliminating non-value adding steps, installing new symphony integrated strainer and redesigning the floor plan, resulted in improved TAT with decrease of 48 minutes per case, Quarterly productivity increased to 8.5%, staff motion decreased from 219 to 182 steps and specimen transportation distance reduced from 773 feet per case to 395 feet per case[11].

The reviewed literature suggests that more studies need to be done to quantify the lean healthcare implication and its success.

AIM, OBJECTIVE, AND METHODOLOGY:

Aim

To eliminate non-value added steps and provide improved work flow in the clinical laboratory of a Tertiary Care Teaching Hospital by using appropriate lean concepts.

Objectives

- To map the process flow and calculate TAT in the laboratory for inpatients
- To identify non-value added activities in the laboratory process flow
- To calculate TAKT time for the laboratory samples
- To develop a framework to improve the workflow efficiency in the Laboratory

METHOD/METHODOLOGY

The research carried out was an “exploratory study” including observational and time and motion methods from February 2017 to July 2017 in a tertiary care teaching hospital, Bangalore, India with the sample size of 255.

Exclusion criteria such as:

- Samples from night shift
- Out-patient and stat samples

RESULT AND DISCUSSION

The existing laboratory workflow was traced from inpatient to clinical laboratory using time and motion study. During the study, time taken at each step of the process was recorded and area or step contributing to delay was identified. Delays were observed mainly in the pre-analytic and analytic phase and root-cause for such delays were identified.

Turn-around Time (TAT)

For ward/ICUs, TAT was calculated from the time doctor ordered for the laboratory test until the reports are validated and available online to view. Among these, only four frequently processed tests for both biochemistry and pathology/hematology laboratory were taken for final calculation of TAT.

Table 1. TAT of Biochemistry and Pathology Samples

<table>
<thead>
<tr>
<th>Sl no</th>
<th>Samples</th>
<th>Processing time</th>
<th>Non-Value added time</th>
<th>TAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sr. Creatinine</td>
<td>27.8</td>
<td>61.20</td>
<td>89</td>
</tr>
</tbody>
</table>
After analysis, it was seen that on an average, selected TAT of Biochemistry samples was 82.98 minutes with processing time of 28.80 minutes and non-value added times of 54.18 minutes. Similarly, in selected Pathology/Hematology samples average TAT is 79.48 minutes with actual processing time of 8.45 minutes and non-value added time of 71.03 minutes.

On an average, the processing time for biochemistry and pathology specimens were 25.08 minutes and 12.99 minutes respectively. The average TAT for biochemistry specimens was 75.36 minutes and for pathology specimens, average TAT was 82.71 minutes.

**TAKT time**

Theoretically, TAKT time for Biochemistry specimen is 1.33 minutes but practically the average processing time is 25.08 minutes as samples were processed in batches. Approximately 598 samples can be processed during 8 hours of shift except during night due to maintenance reason. In Pathology/Hematology laboratory, theoretically, TAKT time is 1.65 minutes but in the real scenario, the average processing time is 12.99 minutes. Approximately 742 samples can be processed during 8 hours of shift with exception on certain reasons but this is not the exact volume as machine breakdown and system error adds to delayed workflow.

**DISCUSSION**

Further these time were categorized into Essential and Non-Essential non-value-added times. ‘Essential non-value-added times’ are the steps that are unavoidable in the entire sample processing though adds to delay in the process but creates value in the workflow. ‘Non-Essential non value-added times’ are the steps those are essentially not so important steps in the process. They can be eliminated to further reduce TAT.

The average Essential and Non-Essential Non value-added time for the selected four tests namely Serum Creatinine, LFT, RFT, and Serum Electrolytes are 17.4 minutes and 26.76 minutes respectively suggests the need for appropriate interventions. In Pathology/Hematology laboratory, the average time for the same as above for tests such as PT, PTT with INR; Hb, PCV; CBC and Urine routine are 20.4 minutes and 26.93 minutes respectively.

Some of the reasons identified during the time of data collection that act as a contributing factor in process delay, but can be eliminated from the workflow processes are delay in carrying out laboratory test orders, unwanted staff motion, inaccuracy in sample collection and transportation.
Figure 1: Revised framework to improve the workflow efficiency in the Laboratory

RECOMMENDATIONS

1. Some of the recommendations given below are the result of delays identified at each phase of the process:

2. Dedicated sample transportation staff in each floor as a major delay was identified in sample transportation to accession room at pre-analytic phase

3. Installation of Pneumatic Chute System to further reduce turnaround time at pre-analytic phase

4. Vein Viewer Flex to avoid delay in the laboratory process and re-do’s caused by sample rejections

5. Redesigning of the Laboratory to reduce unnecessary staff motion and increase the samples being processed at analytic phase

6. Reduction in paper work both at pre-analytic and analytic phase to streamline the laboratory process

CONCLUSION

Laboratory investigation and results plays a major role in the treatment and follow up of the patient. Delay in the laboratory result due to discrepancy at any stage of the work process results in delayed treatment and ultimately leaving the patient unsatisfied with the overall quality care. The study shows that on an average Non-Essential non-value added time in Biochemistry and Pathology laboratory are 26.76 minutes and 26.93 minutes respectively whereas average essential non value-added times are 17.40 minutes (Biochemistry) and 20.40 minutes (Pathology). This suggest to further reduce the delays and non-value added activities from the laboratory workflow to improve the turnaround time providing value to the patient’s need. Focus should be on core problematic care to identify root cause of the delays and then implement suitable methodology and/or quality tools.

Conflict of Interest: No Such Issue

Source of Funding: Self Funding

Ethical Clearance: Ethical Clearance is received from Ramaiah University of Applied Sciences Research Committee

REFERENCES


Development and Assessment of Feasibility of a Prototype Android Application in Management of Dysphagia

Shmiruthy Ranjan¹, Vijay Kumar K V²
¹Postgraduate Student, ²Senior Lecturer, Department of Speech Language and Hearing Sciences, Sri Ramachandra University, Porur Chennai

ABSTRACT

Background: Dysphagia or difficulty in swallowing has varied cause. It is widely seen in individuals post Cerebro Vascular Accident. The associated conditions of stroke limit patients’ possibility to undergo swallowing therapy on a regular basis in a clinical setup. In addition, Speech Language Pathologists (SLPs) working in this domain are scarce in India. Method: An android based application with video in Tamil (regional language) and English was developed by software programmer with the input of SLPs. This application was aimed to be used in adjunct with conventional dysphagia therapy. The link for downloading the application was sent to three patients diagnosed to have dysphagia after clinical swallow examination. These three individuals were instructed to follow the exercises prescribed to them and document in the record sheet after practice. All three participants were instructed to practice the prescribed exercise 4 times a day for 14 days. Results: On clinical swallow examination all three participants improved in their swallowing ability after two weeks of continuous therapy using the application, although not ready for complete oral feeds. Conclusion: This android application would be first of few in India and in Tamil which could be used in treating individuals with dysphagia where there is scarcity of professionals working in this domain. Implication: This could be an adjunct treatment, however cannot replace the role of SLP in the treatment. Level of evidence: Although this android application was field tested, increase in sample size in future would demonstrate its validity in clinical usage.

Keywords: Dysphagia, Speech Language Pathologist, Android based application

INTRODUCTION

Dysphagia is a swallowing disorder that can occur at any stages of the swallowing process including oral, pharyngeal and esophageal stages¹. Several diseases, conditions, or surgical interventions can result in swallowing problems. Signs include painful and prolonged swallowing, choking and coughing, regurgitation, wet or gurgly voice during or after eating, drooling and spilling of food, recurring pneumonia or chest congestion after eating². As a result adults may have poor nutrition or dehydration, risk of aspiration which can lead to pneumonia, less enjoyment of eating or drinking and embarrassment or isolation in social situations involving eating³. A significant focus in treatment is on performing exercises to improve muscles movement, positions or strategies to help the individual swallow more effectively and specific food and liquid textures that are easier and safer to swallow. Dysphagia is remarkably common in the general population. Dysphagia is more common in elderly adults and the most encountered cause is neurogenic in origin, such as stroke, head trauma, skull base tumours and degenerative processes etc. It is reported that 65% of stroke survivors have dysphagia⁴. Limitations in motor movements due to hemiplegia and significant medical complications are commonly encountered in persons post stroke and make it challenging for patients to attend therapy on regular
Globally the issue of not able to access the professional help is addressed through ‘Mobile Health’ technology. In recent past adoption of smart phones among health professionals in service delivery has increased considerably\(^5\). Using mobile technology has been reported in various health sectors including assessment of an individual and providing treatment as well among communication disorders, mental disorders, maternal and newborn healthcare etc, \(^6,7,8\). Using mobile phones plays important role in practice of evidence based treatment and also for patient education. An application that aids in learning of exercises and monitoring the frequency of performing exercises will serve as an adjunct to conventional dysphagia therapy especially for patients who are unable to receive regular therapy in the clinical setting. The aim of this study was to develop and assess the feasibility of using a prototype android application for dysphagia therapy with video demonstrations and instructions.

**METHOD**

**Phase 1: Development of the android application**

The application was developed in two languages (Tamil, the regional language and in English). Based on available literature, exercises/ maneuvers were selected targeting the structures involved in swallowing and facilitating base of the tongue retraction, vocal cords adduction, epiglottis inversion, hyolaryngeal excursion and cricopharyngeous relaxation. The exercises were written in a simpler form such that a common man can comprehend. This procedure of each exercise was then audio recorded. Video recording of these exercises and maneuvers were carried out on a person with normal swallowing ability. Audio recordings were merged with videos and were sent to a professional android programmer for developing an android based application.

**Phase 2:**

On receiving the application, it was discussed with 2 Speech language pathologists (SLPs) who work in the field of Dysphagia. The suggestions provided by the SLPs were incorporated into the application. Additionally a record option was included to monitor the number of times each exercise was performed by the client per day. Figure 1 depicts the language options which is prescribed for individuals with dysphagia. Figure 4 indicates the record sheet where an individual records the number of time an exercise is practiced. Figure 5 and 6 demonstrates samples of exercises and maneuvers used for dysphagia management.
Phase 3:

Three individuals diagnosed to have dysphagia after clinical swallow examination participated in the study. The link to download the application was sent to them through e-mail. The patients were asked to practice the exercises for two weeks and document the number of
times each exercise was practiced. After 2 weeks the SLP carried out clinical swallow examination on these 3 patients.

**Patient profile:**

**Table 1: Demography of patients with medical diagnosis**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Participants</th>
<th>Age</th>
<th>Medical Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Participant 1</td>
<td>55/ F</td>
<td>VC palsy</td>
</tr>
<tr>
<td>2</td>
<td>Participant 2</td>
<td>72/M</td>
<td>PCA stroke</td>
</tr>
<tr>
<td>3</td>
<td>Participant 3</td>
<td>63/M</td>
<td>CVA</td>
</tr>
</tbody>
</table>

These three patients were selected as they had to travel long distance to avail speech therapy service (participant 1) and physical dependency post stroke to commute to speech therapy clinic (Participant 2 and 3).

**Swallowing profile of the patients before initiation on therapy:**

**Patient 1**

Participant 1 was medically diagnosed to have VC palsy. Clinical swallow examination revealed swallowing difficulty for liquids and the patient was provisionally diagnosed to have dysphagia. Oral peripheral mechanism examination results were normal. The patient was recommended to do vocal adduction exercise to improve vocal cord adduction, Mendelson exercise to increased laryngeal movement and to prolong hyolaryngeal elevation. Chin tuck during intake of liquids was advised to have a safe swallow.

**Patient 2**

Participant 2 was provisionally diagnosed with oropharyngeal dysphagia with deviant lips, inadequate pursing and pouting skills and tongue tremors. The patient was recommended to do oromotor exercises to strengthen the oral musculature, base of the tongue exercises to strengthen the base of the tongue, Mendelson exercise to increased laryngeal movement and to prolong hyolaryngeal elevation, Masako exercise to strengthen the base of the tongue, Shaker’s exercise to relax the cricopharyngeus muscle. Vocal adduction exercises to improve vocal cord adduction.

**Patient 3**

Participant 3 was provisionally diagnosed to have Oropharyngeal dysphagia with deviant lips and tongue tremors. Soft palate was deviant and had asymmetrical movement. The patient was advised to do oromotor exercises to strengthen the oral musculature, Masako exercise to strengthen the base of the tongue. Mendelsohn’s maneuver increased laryngeal movement and to prolong hyolaryngeal elevation, supraglottic swallow to voluntarily close the vocal folds during and before the swallow, Shaker’s exercise to relax the cricopharyngeus muscle.

**RESULTS AND DISCUSSION**

Clinical swallow examination was carried out after using the application for 15 days.

**Patient 1:**

Initially the patient demonstrated coughing and throat clearing while swallowing and wet and gurgly voice with prolonged feeding time pre-therapy. After 15 days of therapy the feeding time significantly reduced. Throat clearing and coughing were absent. Voice was clear. The patient had clinically normal swallow for all three consistencies of food.

**Patient 2:**

Initially the patient demonstrated coughing and throat clearing, pocketing of food, prolonged feeding time, gurgly and wet voice after swallowing, dehydration and pneumonia, rejection of food, dehydration and pneumonia. After 15 days of therapy the patient demonstrated wet gurgly voice, coughing and throat clearing for liquids. The patient was able to tolerate puree consistency food using supraglottic swallow. The patient was recommended to continue frequent oral trials of puree and PEG feed to meet nutritional requirements. The patient was also recommended to continue the prescribed exercise and asked to review two weeks later.

**Patient 3:**

Initially the patient demonstrated oral spillage, drooling during swallowing, coughing and throat clearing while swallowing, wet and gurgly voice after swallowing, pocketing of food, prolonged feeding time (Above 45 minutes), rejection of food, dehydration, pneumonia, and weight loss. After 15 days of therapy oral spillage and drooling reduced significantly. Feeding time reduced to 30 minutes. Pocketing of food was absent. Dehydration, temperature spike, and pneumonia were
not reported. The patient was able to consume semisolid 5-10 spoons without gurgly voice using supraglottic swallow. The patient was recommended to continue exercises, and frequent oral trials. Major nutritional requirements were to be met through Nasogastric tube feed. The patient was further advised to continue the exercises and follow up to speech therapy clinic after two weeks of practice.

In this current study, it is evident that all three patients with dysphagia showed improvement in clinical swallow examination after 15 days of practice. Mobile technology-based treatment bridges the gap between the care provider and the patient especially in developing countries where mobile phones allow the clinical support and evidence-based guidance to deliver services in circumstances where a trained professional support and the infrastructure to provide such treatment in a remote place is beyond ones reach. However this result cannot be generalized as the number of participants was less. Such researches require repeated quality practice trials on increased population to understand the effects of technology clinically important outcomes in long term.

CONCLUSION

The usage of android application for dysphagia therapy was found to be effective. Significant improvements in swallowing skills were observed post practice using the application. It was useful in learning of exercises. The record option was useful in monitoring the frequency of performing exercises.

This application could serves as an adjunct tool to conventional dysphagia therapy however cannot be substituted especially for patients who are unable to receive regular therapy in the clinical setting. It is still recommended to have timely follow up with the professional for better outcome in dysphagia management.

Declaration: I Vijay Kumar K V, would like to submit our work titled ‘Development and assessment of feasibility of a prototype android application in management of dysphagia’ to be published in your esteemed Journal. The android based application for Dysphagia management is first of its kind in India using regional language Tamil. The authors have no conflict of interest in this publication.

Funding: This work was carried out as a part of Chancellor’s summer research fellowship of Sri Ramachandra University with a grant of 10000 Indian Rupees by Ms. Shmiruthy Ranjan (First author) under my guidance (corresponding author).

REFERENCES

Bacterial Load and Contamination of Indian Currency Note: Isolation and Transferability Studies of Multi-Drug Resistant Bacteria

Prasanth Manohar1, Thamaraiselvan Shanthini1, Priyanka Goswami1, Munia S1, Haimanti M1, Ashok J Tamhanka2,3, Nachimuthu Ramesh1

1Antibiotic Resistance Laboratory, Department of Biomedical Sciences, School of Biosciences and Technology, VIT University, Vellore, Tamil Nadu, India, 2Global Health, Health Systems and Policy: Medicines- focusing antibiotics, Department of Public Health Sciences, Karolinska Institutet, Stockholm, Sweden, 3Indian Initiative for Management of Antibiotic Resistance, Department of Environmental Medicine, Ruxmaniben Deepchand Gardi Medical College, Ujjain, India

ABSTRACT

Objective: Paper currency notes are found to contaminate with microbes and the dissemination of antibiotic resistance is a global health problem. The aim of this study was to evaluate the prevalence of multi-drug resistant bacteria in the Indian currency notes. Study design: For this study, the Indian currency notes (rupee notes 10, 20 and 50) were collected from Tamil Nadu, Karnataka, West Bengal, Assam, New Delhi and Gujarat using random sampling technique. The sampling was categorised into; category 1: local markets, beggars, street vendors, conductors, hospitals and Category 2: supermarkets, banks including ATM machines, and hotels. Method: Spread plate technique, specific media and biochemical tests were used for the bacterial isolation and identification. Identification of multiple drug resistance, PCR-based screening of resistance genes and conjugation studies were performed. Results: The total of 75 bacteria was isolated including Bacillus sp., Streptococcus sp., Staphylococcus sp., Staphylococcus aureus, Escherichia coli, Klebsiella sp., Pseudomonas sp. and Salmonella sp. Multi-drug resistance was observed in 32/75 (43%) isolates and the prevalence of 25% ertapenem-resistant and 21% cefotaxime resistant bacteria was observed. The presence of blaCTX-M-9 in three isolates such as E. coli (two) and Klebsiella sp. was screened and E. coli isolates were found to involve in conjugating its resistance to E. coli AB1157. Conclusions: Our study showed the prevalence of multiple drug resistant bacteria in the Indian currency notes and also in disseminating its resistance.

Keywords: Antibiotic resistance, Bacterial contamination, extended spectrum beta-lactamases, Indian currency, multiple drug resistance.

INTRODUCTION

Antibiotic resistance is one of the major global health problems of the 21st century. The development and dissemination of multi-drug resistance (MDR) among bacteria make the diseases more severe and complicated.1 As money is ultimate for living it is unavoidable for every human to be rather associated with money.2 When paper currencies are used as a medium of exchange it can be easily contaminated by bacteria, fungi and other parasites because of the unhygienic handling.3,4 Currency notes are frequently transferred to different geographical regions and they are also known to carry pathogens though the precise mode of contact and significance of pathogen contamination are not known.5 Because of the globalized nature of currency notes, the contaminated money (carrying microbes) can disseminate microbes across its track.5,6

Correspondence author:
Dr. N. Ramesh
Assistant Professor, Department of Biomedical Sciences, School of Biosciences and Technology, VIT University, Vellore-632014.
E-mail: drpnramesh@gmail.com, M: +91 9843660673
A huge amount of paper currencies is circulating among various corners of the civilized world which pave the opportunity for microbes to stick. According to the previous reports, the paper currency notes were contaminated with bacteria such as *Escherichia coli*, Klebsiella sp., *Citrobacter* sp., *Salmonella* sp., *Mycobacterium* sp., *Pseudomonas aeruginosa*, Proteus sp., *Streptococcus* sp., and *Staphylococcus* sp. There are several sources that can contribute to the contamination of currency notes such as atmosphere, environmental factors, storage, unhygienic human-handling etc. Survey reports suggested that the pathogens carried by the currency notes or coins are very high whereas pathogenic *E. coli* O157:H7 and *Salmonella enteritidis* were found to survive up to eleven days on the surface of the currency notes. Therefore, the purpose of this study was to evaluate the level of bacterial contamination and the distribution of multi-drug resistant bacteria in the Indian paper currencies collected from the different states of India.

**METHOD**

**Collection of currency notes and study area**

For this study, Indian currency notes (rupee notes 10, 20 and 50) were collected from six different states that included in South India; Tamil Nadu (Chennai, Vellore) and Karnataka (Bangalore), East India; West Bengal (Kolkata) and Assam (Guwahati), Central India; New Delhi and West India; Gujarat (Ahmadabad) using stratified random sampling technique. From all the six states sampling was categorised into; category 1: local markets (fish/meat/chicken/vegetable), beggars, street vendors, conductors (bus/train), hospitals and Category 2: supermarkets, banks including ATM machines, hotels. The samples were collected aseptically in which the sampling individual was allowed to drop the currency notes directly into the sterile polypropylene bags. The individuals were given the replacement currency equivalent to the sample notes. The sample bags were immediately sealed and transported to Antibiotic Resistance Laboratory, VIT University, Vellore for further analysis.

**Bacterial isolation and identification**

Briefly, the currency notes were dipped in the sterile 20 mL tryptone water and incubated in the shaking incubator for 24 h at 37°C. Serial dilution was performed from $10^{-1}$ to $10^{4}$ in nutrient agar plates and the highest bacterial load was calculated (cfu/ml). For bacterial identification, selective media such as MacConkey agar (Gram-negative bacteria), Eosin Methylene Blue (EMB) agar (*E. coli*), mannitol salt agar (*Staphylococcus* sp.), and Klebsiella selective media were used. Biochemical tests such as oxidase, coagulase, citrate and urease were used for differentiation within the bacterial groups.

**Antibiotic susceptibility testing**

Antibiotic resistance profiles for the isolates were established against gentamycin (10 mcg), tetracycline (30 mcg), amoxyclyv (30 mcg), cefotaxime (30 mcg), ertapenem (10 mcg), rifampicin (5 mcg), methicillin (5 mcg), amikacin (30 mcg), piperacillin/tazobactum (100/10 mcg), vancomycin (30 mcg), and erythromycin (15 mcg). Briefly, in the prepared Mueller-Hinton agar plate’s bacterial lawn was made and antibiotic discs (HiMedia, Mumbai) were placed. The plates were incubated at 37°C for 18 h and analysed for the zone of inhibition.

**Selection of isolates for molecular studies**

All the isolates recovered from the currency notes were selected for the screening of beta-lactam resistance genes and only methicillin-resistant *Staphylococcus aureus* (MRSA) for mecA gene. Briefly, DNA was isolated from all the isolates using boiling-centrifugation method. The isolates were screened for the presence of *bla*~CTX-M~ group genes (CTX-M-1, 2, 8, 9, 25), New Delhi Metallo-beta-lactamase (*bla*~NDM~), *bla*~OXA-48-like~*~*, *bla*~IMP~, *bla*~VIM~, *bla*~KPC~, *bla*~SIM~, *bla*~AIM~, *bla*~HIC~, *bla*~GIM~ and mecA genes using the primer sequences and PCR conditions as stated earlier.

**Transconjugation studies**

The resistant isolates were chosen for conjugation testing. Briefly, streptomycin-resistant *Escherichia coli* AB1157 (Str') was used as a recipient and the isolates carrying antibiotic resistant genes served as a donor. Both the donor and recipient cells were grown overnight (10⁶ cells/ml) in Luria-Bertani broth and the cells were mixed at 9:1 (donor: recipient) ratio, kept undisturbed for 4 h at 37°C. For transconjugation to be successful the donor isolate should be susceptible to streptomycin and the recipient isolate should be susceptible to all the antibiotics under study. So the transconjugants were selected on the LB agar plates supplemented with streptomycin in combination with the test antibiotic.
(cefotaxime). The frequency of conjugation was calculated using the total number of transconjugant cells versus the total number of donor/recipient cells.

RESULTS

Our data showed that the samples from Category 1 (local markets, beggars, street vendors, conductors, hospitals) having the maximum bacterial load (contamination) compared to category 2 (supermarkets, banks including ATM machines, hotels). From the collected Indian currency samples, the total of 75 bacteria belonging to eight different genera was isolated and identified. The number of Gram positive and Gram negative bacteria were distributed randomly irrespective of the sample location and category (Table 1). The identified Gram positive bacteria included Bacillus sp. (13%), Streptococcus sp. (12%), Staphylococcus sp. (13%), and Staphylococcus aureus (15%). The Gram negative bacterial population included Escherichia coli (20%), Klebsiella sp. (8%), Pseudomonas sp. (9%), and Salmonella sp. (9%) (Fig.1), so marginally the percentage of Gram positive bacteria (53%) topped the Gram negative (47%). The prevalence of antibiotic-resistant isolates was tested against 11 different antibiotics using disc diffusion method (Table 2). Interestingly, 32/75 (43%) isolates were found to be multi-drug resistant (MDR) of which E. coli (7/15), Klebsiella sp. (2/6), Pseudomonas sp. (3/7), Salmonella sp. (2/7), Bacillus sp. (5/10), Streptococcus sp. (3/9), Staphylococcus sp. (4/10), and S. aureus (6/11) (Fig. 1). It was also noted that two methicillin-resistant Staphylococcus aureus (MRSA) was isolated from the currency note samples (category 1) collected from Tamil Nadu and West Bengal. The prevalence of ertapenem (carbapenem) and cefotaxime (3rd generation cephalosporin) resistant bacteria were 25% (n=19) and 28% (n=21) respectively. PCR-based screening for the bla_{CTX-M} group genes showed the presence of bla_{CTX-M-9} in three isolates such as E. coli (two) and Klebsiella sp. Genes bla_{NDM}, bla_{OXA-48-like}, bla_{IMP}, bla_{VIM}, bla_{KPC}, bla_{DIM}, bla_{SIM}, bla_{AIM}, bla_{BIC}, bla_{GIM} and mecA were absent in all the isolates tested. Conjugation studies were performed to elucidate the transfer of resistance gene bla_{CTX-M-9} to Escherichia coli AB1157. Both E. coli carrying bla_{CTX-M-9} was found to transfer its resistance gene at a frequency of 3x10^{-5}. No transformants were observed in the case of Klebsiella sp. Our data showed that only intra-genus transfer of resistance was possible in the case of bacteria isolated from currency notes but the inter-genus transfer was absent.

Figure 1: Distribution of Gram positive and Gram negative bacterial contamination in Indian currency.

Table 1: Analysis of bacterial load and percentage distribution of bacteria in Indian currency note

<table>
<thead>
<tr>
<th>Sample collection (State/category)</th>
<th>Bacterial load (cfu/ml)</th>
<th>% of Gram positive and Gram negative (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamil Nadu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category 1</td>
<td>3.1 X 10^4</td>
<td>60% and 40%</td>
</tr>
<tr>
<td>Category 2</td>
<td>1.04 X 10^3</td>
<td>30% and 70%</td>
</tr>
<tr>
<td>Karnataka</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category 1</td>
<td>4.12 X 10^5</td>
<td>50% and 50%</td>
</tr>
<tr>
<td>Category 2</td>
<td>1.0 X 10^3</td>
<td>70% and 30%</td>
</tr>
<tr>
<td>West Bengal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category 1</td>
<td>3.4 X 10^3</td>
<td>60% and 40%</td>
</tr>
<tr>
<td>Category 2</td>
<td>2.1 X 10^2</td>
<td>40% and 60%</td>
</tr>
<tr>
<td>New Delhi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category 1</td>
<td>4.3 X 10^4</td>
<td>10% and 90%</td>
</tr>
<tr>
<td>Category 2</td>
<td>1.09 X 10^2</td>
<td>50% and 50%</td>
</tr>
<tr>
<td>Assam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category 1</td>
<td>2.5 X 10^4</td>
<td>30% and 70%</td>
</tr>
<tr>
<td>Category 2</td>
<td>1.1 X 10^4</td>
<td>40% and 60%</td>
</tr>
<tr>
<td>Gujarat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category 1</td>
<td>2.0 X 10^4</td>
<td>30% and 70%</td>
</tr>
<tr>
<td>Category 2</td>
<td>1.45 X 10^3</td>
<td>70% and 30%</td>
</tr>
</tbody>
</table>

Category 1: local markets (fish/meat/chicken/vegetable), beggars, street vendors, conductors (bus/train), hospitals.
Category 2: supermarkets, banks including ATM machines, hotels

**Table 2: Antibiotic resistance profile for bacteria isolated from Indian currency note.**

<table>
<thead>
<tr>
<th>Sample location</th>
<th>Category (total)</th>
<th>Antibiotics/Total number of resistant isolates (n)</th>
</tr>
</thead>
</table>
| Tamil Nadu      | Category 1 (n=9) | Ge 5  
Tet 3  
Ax 6  
Cf 4  
Ep 2  
Rf 4  
Mt 3  
Am 7  
P/T 6  
V 3  
E 9 | |
|                 | Category 2 (n=4) | Ge 1  
Tet 2  
Ax 3  
Cf 1  
Ep 1  
Rf 2  
Mt 3  
Am 3  
P/T 2  
V 3  
E 3 | |
| Karnataka       | Category 1 (n=10)| Ge 4  
Tet 5  
Ax 6  
Cf 4  
Ep 3  
Rf 5  
Mt 6  
Am 8  
P/T 6  
V 5  
E 9 | |
|                 | Category 2 (n=2) | Ge 1  
Tet 2  
Ax 1  
Cf 0  
Ep 0  
Rf 2  
Mt 1  
Am 2  
P/T 1  
V 1  
E 2 | |
| West Bengal     | Category 1 (n=10)| Ge 5  
Tet 6  
Ax 4  
Cf 2  
Ep 3  
Rf 4  
Mt 6  
Am 7  
P/T 5  
V 6  
E 6 | |
|                 | Category 2 (n=2) | Ge 0  
Tet 2  
Ax 1  
Cf 1  
Ep 1  
Rf 0  
Mt 0  
Am 1  
P/T 1  
V 0  
E 2 | |
| New Delhi       | Category 1 (n=4) | Ge 3  
Tet 1  
Ax 2  
Cf 2  
Ep 2  
Rf 1  
Mt 3  
Am 4  
P/T 4  
V 4  
E 4 | |
|                 | Category 2 (n=6) | Ge 1  
Tet 2  
Ax 1  
Cf 0  
Ep 0  
Rf 2  
Mt 0  
Am 2  
P/T 0  
V 2  
E 2 | |
| Assam           | Category 1 (n=9) | Ge 3  
Tet 3  
Ax 2  
Cf 2  
Ep 3  
Rf 5  
Mt 4  
Am 6  
P/T 5  
V 5  
E 5 | |
|                 | Category 2 (n=5) | Ge 1  
Tet 1  
Ax 0  
Cf 0  
Ep 1  
Rf 0  
Mt 0  
Am 1  
P/T 0  
V 0  
E 1 | |
| Gujarat         | Category 1 (n=7) | Ge 3  
Tet 4  
Ax 3  
Cf 2  
Ep 3  
Rf 4  
Mt 0  
Am 4  
P/T 3  
V 3  
E 6 | |
|                 | Category 2 (n=7) | Ge 5  
Tet 4  
Ax 3  
Cf 3  
Ep 3  
Rf 2  
Mt 2  
Am 3  
P/T 5  
V 5  
E 6 | |

Ge-gentamycin (10 mcg), Tet-tetracycline (30 mcg), Ax-amoxyclav (30 mcg), Cf-cefotaxime (30 mcg), Ep-ertapenem (10 mcg), Rf-rifampicin (5 mcg), Mt-methicillin (5 mcg), Am-amikacin (30 mcg), P/T-piperacillin/tazobactum (100/10 mcg), V-vancomycin (30 mcg), and E-erythromycin (15 mcg). Category 1: local markets (fish/meat/chicken/vegetable), beggars, street vendors, conductors (bus/train), hospitals. Category 2: supermarkets, banks including ATM machines, hotels.
DISCUSSION

Developing antibiotic resistance poses a very serious issue not only in the developing countries but also in the developed nations. The spread of multi-drug resistant bacteria is uncontrollable and currency notes are well recognized as a transmissible tool for the spread of microbes and pathogens. In our study, it was found that there was a high percentage of bacterial contamination in Indian currency notes (Rupee) especially by multi-drug resistant bacteria.

In India, the spread of infectious diseases are very common and awareness about hygiene is less. There were previous studies that had reported the carriage of bacterial load in Indian currencies. A study conducted by Elumalai et al., 2012 reported the bacterial contamination of Indian currency notes collected in Vellore, Tamil Nadu and they showed the presence of E. coli, Proteus mirabilis, Vibrio sp., S. aureus, Pseudomonas sp., Salmonella sp., Bacillus sp., and Klebsiella sp. and similar reports were also from other parts of the world. This study also evaluated the prevalence of Bacillus sp. (13%), Streptococcus sp. (12%), Staphylococcus sp. (13%), S. aureus (15%), E. coli (20%), Klebsiella sp. (8%), Pseudomonas sp. (9%), and Salmonella sp. (9%). An important aspect of this study is the prevalence of multi-drug resistant bacteria on the Indian currency notes in circulation. Though multiple drug resistance in bacteria is causing serious public health problems, our data showed the prevalence of 43% of MDR in Indian currency notes with the prevalent carbapenem (25%) and cephalosporin (28%) resistance. World Health Organization (WHO) has provided carbapenem-resistant Enterobacteriaceae and Pseudomonas aeruginosa in the critical priority list for the immediate need for new antibiotics against these serious pathogens. But the transmission of carbapenem-resistant E. coli, Klebsiella sp. and Pseudomonas sp. in the currency notes are extremely dangerous considering their severity in pathogenesis.

Our study showed the presence of extended-spectrum beta-lactamase (ESBL) gene (blaCTX-M) in E. coli and Klebsiella sp. which is a critical health problem because there are lesser antibiotics available to treat ESBL producing bacteria. An important aspect of this study is the presence of a conjugating (transferable) blaCTX-M-9 gene in E. coli that can disseminate among people and cause serious health issues. All the paper currencies that are evaluated in this study were contaminated with bacteria (multi-drug resistant bacteria) suggesting the need for potential strategies to overcome the problem. Our study did not precisely conclude the sample location and the type of bacteria encountered so sampled currency notes may be contaminated outside the study region. In future, antibiotic survey programs should be expanded so that the tracking/monitoring of antibiotic resistance in currency can be executed. In order to overcome the problem of circulating pathogens in the currency notes, the government should take necessary steps to replace the paper currencies with the washable plastic currency notes, implementing survey programs to monitor the quality of currency note, should consider imposing expiry dates for currency notes and also can encourage the ‘cashless’ transactions. Awareness should also be created among the public about the hygienic practices that can be followed while using paper currencies.

Conflict of Interest: The authors declare that there is no conflict of interest.

Funding Information: This study was not funded by any external body.

Ethical Clearance: For this study ethical clearance was obtained from Institutional Biosafety Committee (IBSC), VIT University.

REFERENCES
5. Bhat N, Bhat S, Asawa K, Agarwal A. An assessment of oral health risk associated with handling of


Prescription Audit of Outpatient Departments of a Tertiary Care Hospital in Maharashtra

Anil Pandit, Jyoti Joshi, Amrita Vaidya

Professor, MD (Obs & Gyn) MBA (HHM) Symbiosis Institute of Health Sciences, S B Road, Pune,
AMS, Ruby Hall Clinic, Wanorie, Pune

ABSTRACT

Prescription Audit is one of the methods to assess drug utilization and rationality of prescribing. Irrational prescribing is a worldwide problem. It is due to the faulty prescribing habits, lack of training amongst health care personnel, pressure from the pharmaceutical companies, and a lot of other reasons.

Method: The study was conducted by noting the details of patients admitted during 3 months. Prescriptions were collected from the OPDs of medicine, surgery, obstetrics & gynecology, pediatrics, orthopedic randomly.

Results: One thousand prescriptions were analyzed in which 1986 drugs were prescribed. Mean number of drugs per prescription was 6.49%. 63.34% drugs were prescribed. Dosage forms used were mostly oral (69.54%). Infectious and parasitic diseases were the most common illnesses (16.01%) followed by diseases of respiratory system. The incidence of poly-pharmacy was common with maximum number of prescriptions (26.8%) having 5 drugs per prescription. 77% of the prescriptions contained only one diagnosis. The average number of drugs per prescription was 3.1. 60 % of the drugs were prescribed by generic names and 23% of the prescribed drugs were in combination. 25% of the prescriptions contained at least one injection, while 35% contained at least one antibiotic. In 16% of the prescriptions a vitamin or tonic was prescribed.

Conclusion: Prescription audit is an important measure to improve the quality of care afforded by the hospital. By this data we conclude that poly-pharmacy is quite common.

Keywords: Patient Safety, Prescribing patterns, Drug utilization pattern, Prescription Audit.

INTRODUCTION

The main purpose of conducting a prescription audit is to enhance the quality of care in the secondary level hospital in the state. Improvement in the prescribing practices of doctors working in the project hospitals is one of the initiatives taken up, to improve the quality of care.

Drug utilization has been defined as the marketing, distribution, prescription and use of drugs in a society with special emphasis on the resultant medical and social consequences. Third world countries spend 30–40% of their total health budget on drugs some of which are useless and expensive and doubles their expenditure on drugs every 4 years while GNP (Gross National Product) doubles every 16 years.

Drug utilization pattern needs to be evaluated from time to time so as to increase therapeutic efficacy and decrease adverse effects. Historically the pharmaceutical and medical profession has devoted considerable time and efforts to the development and rational utilization of safe and effective drugs for the treatment and prevention of illness.

There has been development of many new therapeutic agents which have made it possible to cure or provide the symptomatic control of many clinical disorders. However in many circumstances drugs are not used rationally for optimal benefits and safety.

Prescription audit is an important mechanism to improve the quality of care offered by the hospitals. Data generated on the morbidity pattern, coupled with the current practices of treatment of these diseases,
provided an objective basis for preparing an Essential Medicines List. Comparing the current usage of drugs with the standard treatment guidelines, will enhance the effectiveness of treatment and render it cost-effective.

A prescription audit was considered appropriate to improve the usage of drugs by the doctors.

The World Health Organization (WHO) proposed core-prescription indicators for prescription audit and drug utilization studies. The focus of Indian studies has mainly been on the WHO core-prescribing Indicators, such as the range and number of drugs per prescription. Another study reported, that half of the patients received more than one antibiotic and hospital pharmacy-based studies reported that practice of polypharmacy was rampant. 75% of the prescriptions contained Fixed Dose Combinations (FDCs). An analysis of prescriptions for diarrhea also revealed that about 60% contained FDCs. Another study of 292 prescriptions for diarrhea reported use of 63 different drugs.

The prescription audit studies have been conducted in diverse settings like outpatients and inpatients in the hospital, and hospital pharmacy with a small sample size.

**AIM AND OBJECTIVES**

The present study was carried out to analyze the patterns of prescription and drug use amongst outpatient attendees of the hospital. The aim was to conduct a thorough check of the prescriptions given to the patients and find out whether they were in compliance with the core prescription indicators of WHO. And whether correct prescribing practices were being followed by the clinicians in the hospital or not. The objectives of the audit were,

To detect the frequently prescribed drugs to treat the patients attending the OPDs, and to prepare an essential medicines list (EML) for the four categories of hospitals, for OPD use.

To analyze the prescription of drugs and generate information on the core prescribing indicators as proposed by the WHO.

To articulate measures to improve prescription practices of the doctors working in the hospital.

**MATERIALS AND METHOD**

Prescriptions of the out-patients were audited through a specially designed form and analyzed for the following: average number of drugs per prescription, duration of treatment (recorded or not), dosage forms prescribed, frequency of administration (recorded or not), number of encounters with antibiotics and percentage of drugs prescribed by generic name. The study was conducted of the prescriptions given to the patients of the hospital. A copy of the prescription was obtained with the help of a pre-inserted carbon, in a special format. Data for only ‘first encounter prescriptions’ was collected for all patients attending the Outpatient Department (OPD).

The study followed the prospective methodology. Before starting the study an initiation workshop was conducted, to explain the objectives of the study, method of using the specially designed forms, and also to address the apprehensions of the doctors. The form designed was quite similar to the regular OPD chit used in the hospital. The forms were printed in duplicate with pre-inserted carbon.

The form was given only to the ‘new cases,’ as the study was aimed at ‘First Encounter Prescriptions.’ The hospital was asked to use the specially designed forms in place of the regular OPD papers, till the supply was exhausted. The doctor retained the carbon copy in an envelope, with doctor details. The filled in forms were collected from the participating doctors and analyzed using MS Access and SPSS.

The diagnoses in the filled-in prescription forms were coded using International Classification of Diseases — 10 (ICD 10). The Anatomical Therapeutic Chemical (ATC) Classification developed by the World Health Organization, was used for coding the drugs.

**Sample Size and Distribution**

The number of forms given was 1000 in number. All the OPDS in the hospital of all specialties were included in the study. The proportion of females was marginally higher, at 51.4%, while children (14 years or less) constituted 28.4%, adolescents (15 – 19 years) constituted 7.9%, adults (20 – 59 years) formed 52.1% and the 60 and above age group formed 10.5%.

**RESULTS**

Prescription analysis showed that duration of
treatment was recorded for only 26.4% of the drugs prescribed. The maximum number of drugs prescribed were in the form of eye drops (76%), followed by tablets (10.9%), ointments (6.4%), syrups (1%), capsules (0.7%), lotions (0.3%) and injections (0.1%). No dosage form was recorded for 4.6% of the drugs prescribed.

The frequency of administration was recorded for only 77.9% of the drugs prescribed. The number of antibiotics prescribed was 1059 which constitutes 34.2% of the total number of drugs prescribed. The percentage of drugs prescribed by generic name was only 35%.

Mean number of drugs per prescription was 6.49%. In our study, Dosage forms used were mostly oral (69.54%). Infectious and parasitic diseases (ICD Code A00-B99) were the most common illnesses (16.01%) followed by diseases of respiratory system (ICD code J00-J99) (10.8%) and diseases of the digestive system (ICD Code K00-K99) (5.7%).

The most common drug groups prescribed were GIT, antimicrobials, antihistaminic, multivitamins and minerals. The incidence of poly-pharmacy was also common with maximum number of prescriptions (26.8%) having 5 drugs per prescription.

77% of the prescriptions contained only one diagnosis. The average number of drugs per prescription was 3.1. 60% of the drugs were prescribed by generic names and 23% of the prescribed drugs were in combination. 25 percent of the prescriptions contained at least one injection, while 35% contained at least one antibiotic.

In 16% of the prescriptions a vitamin or tonic was prescribed. 46% of the single ingredient formulations were as per the WHO 2003, Essential Medicines List (EML). Based on the findings of the Prescription Audit an EML was prepared for each category of the secondary level hospitals, for use in the OPD. In 33% of cases, the treatment was provided based on symptoms and signs (ICD Code R00-R99).

The results obtained in this study indicated that an awareness of poly-pharmacy but a high incidence of common prescription writing errors such as not recording the duration of therapy, frequency of administration and dosage form. Moreover prescribing by generic name was also low.

**DISCUSSION**

The ‘Prescription Audit’ of the Outpatient attendees in the hospital was an enabling exercise in spirit. Assessment of the rationality of prescriptions by a doctor in a hospital is appropriate if the hospital has Standard Treatment Guidelines (STGs) and the doctors are made aware of the STGs and are provided with the guidelines, at least for the diseases commonly treated by them. At the time of the study the hospital did not have any STGs to be followed by the doctors.

Formulation was mentioned in 95% of the drugs prescribed. However, all details namely (a) strength, (b) dose, and (c) number of days were mentioned only in 38.8% of the tablets, in 50.1% of the capsules, and in 16.1% of the injections. By default, in the project, hospitals drugs were given for three days, unless the prescription mentioned otherwise. Some doctors stated that there was no need to mention the details because packs of only limited strength were available in the hospital.

31% of the prescriptions contained four or more drugs. By comparing with the STGs for diseases for which such prescriptions were made, they could be justified or categorized as irrational prescriptions. Still 40% of the doctors used brand names. The reasons for using brand names need to be understood (such as comfortability with brand names, opinion that generic drugs are of low quality, etc.) and addressed with appropriate interventions.

**RECOMMENDATIONS**

Based on the findings of the study some prescription practices may be considered for improvement.

**Measures suggested to promote Rational Prescription Practices**

The hospital should formulate a drug policy as it did not have one, addressing issues like EDL, procurement, and so on.

The drugs included in the core list of EDL covered about 80% of the morbidity load of OPDs. Hence, the hospital administrator should ensure adequate supply...
of these drugs of assured quality and effectively. Non-availability of the drugs in EDL may result in prescribing other alternatives and use of brand names.

Promotion of rational prescription practices requires that the hospital doctors are provided with the Standard Treatment Guidelines (STGs).

The following information, education, and communication (IEC) interventions are needed to create an enabling environment and promote behavior change.

a) For patients

The drugs provided must be of good quality.

Doctors must give medicines like vitamins, IV saline, and injections as per the patient’s needs. Patients should not insist on the prescription of saline or strong / powerful medicines.

Doctors must not prescribe unnecessary medicines and if needed, essential drugs must be prescribed.

The medicines taken without doctor’s prescription may be harmful.

b) For doctors

The drugs provided should be of good quality. They could be obtained at a lower cost following procurement practices of the hospital like, (a) buying directly from the manufacturer, (b) centralized procurement, and (c) buying generics instead of brands.

Doctors should use antibiotics very carefully by putting in place an antibiotic policy. Otherwise antimicrobials will lose their effectiveness.

Doctors should be made aware of the advantages of prescribing drugs using generic names, such as, (a) cost effectiveness and (b) minimizing medication errors, due to sound alike brand names.

More stringent measures be initiated such as, recovery of the cost of drugs if the prescription is found unjustified, could also be considered by the hospital.

**CONCLUSION**

Prescription audit is an important mechanism to improve the quality of care afforded by the hospitals. Comparing the current usage of drugs with the standard treatment guidelines will enhance the effectiveness of treatment and render it cost-effective. Prescription audits are useful in generating data on morbidity, which forms the basis for preparing the list of essential medicines. Mechanisms necessary for improving prescription practices are suggested.

The study has not been funded by any agency.

Authors declare that there is no conflict of interest.

The study was conducted by management trainee, as a part of Summer Internship Program of MBA (Hospital & Healthcare Management); there was no direct or indirect intervention with patient care and hence no ethical issues were involved.

**REFERENCES**


Differences in the Influence of the Quality of Life to Marital Satisfaction in Women Early Marriage and Not Early Marriage

Nur Laily¹, Nia Kania², Adenan², Bahrul Ilmi³, Lenie Marlinae³

¹College Student of Magister Public Health, Medical Faculty, Lambung Mangkurat University, ²Departement of Medicine, Medical Faculty, Lambung Mangkurat University, ³Departement of Public Health, Medical Faculty, Lambung Mangkurat University

ABSTRACT

Based on the book Data Analysis of Marital Age of Children in Indonesia launched by BPS and UNICEF on July 20, 2016 mentioned that in 2015 South Kalimantan is second in the province with the highest prevalence of marriage of child age, which is about 33.68% after West Sulawesi Province with Prevalence of 34.00%. Data based of BKKBN South Kalimantan Province shows the number of early marriage from year to year tend to increase. When viewed from the development, Banjar District is one of the districts with the percentage of the early age at marriage is higher than the condition of South Kalimantan Province namely 1.48 percent during the period of 2012-2015. Early age marriage is very influential on the physical and mental women and social conditions and the environment so that it is an impact on the quality of life of women who do weddings at an early age. The quality of life related to the purpose of life and individual targets in led his life. Therefore, it is necessary to research to explain the differences influence the quality of life to marital satisfaction in women early marriage and not early marriage in Martapura the Banjar District. The design of this research is quantitative research with case control to study of the influence between the quality of life in women who married early marriage satisfaction reviewed from the aspects of physical health, health psychological, social relations and the environment by comparing the case group and the control group. The results of the Chi Square showed no influence between the quality of life of the physical health aspects, psychological health and the environment against marriage satisfaction in women who married early with the value of the p-value sequence of 0.217, 0.484 and 0.059 (p>0.05). And there is the influence of the quality of life of the aspects of the social relations of marriage satisfaction in women who married early with the value of the p-value 0.000 (p<0.05). While the women who are not married early, there is no impact on all aspects of the quality of life of marriage satisfaction with the value of the p-value<0.05. Therefore, there is no difference influence between the quality of life of health aspect physical, health psychological and environment to the level of marital satisfaction to women married early and not early marriage.

Keywords: quality of life, marital satisfaction

INTRODUCTION

Early marriage according to the BKKBN is a marriage which is done by teenage girls under the age of 21 years and men under the age of 25 years¹. In Indonesia at the age of marriage under 20 years still classified as high as 20 percent and located on ranked to 37 world and the second highest in ASEAN after Cambodia ². National BKKBN Data 2012 about early marriage, pointed provinces with percent tase early marriage (15-19 years) is highest in Central Kalimantan (52.1%), West Java (50.2%), and South Kalimantan (48.4 % ). P is the year 2014 occur increasing percent tase early marriage in South Kalimantan by 10.1% , which means percent tase early marriage shows the number of 58.5 percent on the year 2014 ³.
Based on book Data Analysis Marriage age children in Indonesia which was launched by the BPS and UNICEF on July 20, 2016 mentioned that in 2015 South Kalimantan is located on the second sequence as the province with the highest prevalence of marriage age children, i.e. around 33.68% . The BKKBN Data South Kalimantan Province shows the number of marriage early age from year to year tend to increase. In 2012 occurs 242 marriage under the age and continue to increase to 293 marriage in 2013, 323 marriage in the year 2014 and 391 marriage under the age in 2015. This shows an increase in the percentage of marriage early age of 1.41 percent during the period of 2012-2015.

The risk of marriage early age vary between one region with other regions. The impact of the wedding early age will be more to be visible on the young girls compared with the young man. Early Age marriage cause pregnancy and childbirth early as well that will be associated with a high mortality rate and the situation is not normal for the mother because the organs of the female body has not yet been fully mature to give birth. (TFR) also has an impact on the economic development and welfare (Data Analysis Marriage age children in Indonesia, 2016). The number of pregnancy women in Indonesia at the age of 10-54 years is 2.68 %, and at the age of approximately 15 years is 0.02%, and pregnancy at the age of teenagers (15-19 years) of 1.97 %.

Weddings at a young age can also cause disorders personality development and put the son who was born at risk against the genesis of violence, keterlantaran and delays in the development of the learning difficulties and behavior disorders tend to become parents at an early age. Weddings at a young age burden the son of the woman with the responsibility of being a wife, candidate sex and mother, roles that should be done by adults who are not ready to be done by the daughters of causing psychological and emotional burden that great for them and become a factor of increasing divorce case (Topic et al, 2013). In Banjar District numbers divorce on 2015 high enough, of approximately 918 cases documented in the religious court and many more or less 20% cases experienced by married couples at the early Religious Court Counties Banjar, 2016.

According to research Sudarto (2014) p empuan who undergo weddings at a young age will have difficulty in developing the way the care and attention to their children later. This will have an effect on life and satisfaction of the couple of husband and wife in his nuptials that play an important role in individual behavioral patterns. In addition, p ernikahan early age very affect women physical and mental and social conditions and the environment, s until the very have an impact on the quality of life of women who do weddings at an early age. The quality of life related to the purpose of life and individual targets in led his life and is an individual perception about the dignity and dignity in the context of the culture and value system where the individual is located.

Based on this early marriage can affect many aspects of life so that the researchers want to examine more on the quality of life in women who married early marriage satisfaction in the sub-district Martapura City of Banjar District.

MATERIALS AND METHOD

The type of reasearch is quantitative research with research design case control to learn the greatness of the influence between the quality of life to marital satisfaction in women early marriage and not early marriage in Martapura the Banjar District. The research carried out during the month of March until April 2017. The samples taken can be done by using the formula of the Lameshow. the number of samples in this research is 76 people for cases and 76 people to control. using purposive sampling method sampling with the following criteria.

The instrument used in this study was a questionnaire. The free variables in this study are aspects of physical health, health psychological, social relations and the environment by comparing the case group and control group.

Technique data analysis with (1) used to view the distribution of the frequency of each of the variables separately, both variables bound, namely customer satisfaction of marriage and free variable is the quality of life; (2) analysis of bivariat used to analyze the influence of the quality of life in women who married early reviewed from the health of the physical, psychological, social relations, and the environment in the sub-district Martapura city against marriage satisfaction. Then to analyze the data that has been dikumpulka n then used the method of statistics Chi Square with equal significant α = 0.05.
RESULT AND DISCUSSION

Based on the results of research on women early marriage and not early marriage obtained the result that there is no influence between the physical health of marriage satisfaction. On the women who married early quality of life aspects of physical health majority votes in the category of just as many as 38 respondents (50.0%) with 4 respondents (5.3%) located on category are not satisfied and 34 respondents (44.7%) in the category satisfied. While the women who are not married early quality of life aspects of physical health majority votes in the category of just as many as 32 respondents (42.1%) with entirely satisfied against marriage which rest. Based on the results of the questionnaire physical health conditions that respondents feel during the marriage which lived at both the respondents who married early or not married early do not feel wedding was interrupting daily activities, even impede their work in charge of the household.

Based on the results of research it is known that there is no difference between the influence of the quality of life of psychological health aspects of good marriage satisfaction in women who married early or not married early. On the women who married early quality of life aspects of psychological health majority votes in the category of just as many as 38 respondents (50.0%) with 5 respondents (6.6%) located on category are not satisfied and 33 respondents (43.4%) in the category satisfied. While the women who are not married early quality of life aspects of physical health majority votes in the category of good as many as 39 respondents (51.3%) with 2 respondents (2.6%) located on category are not satisfied and 37 respondents (48.7%) in the category satisfied. This is caused by the majority of respondents receive good all the conditions of himself now as able to concentrate, accept the condition of his body today and feel his life just means during the days of marriage. There are other factors that more dominant that affect customer satisfaction of marriage is the existence of the son.

Based on the results of research it is known that there is a difference between the influence of the quality of life of the aspects of social relations to customer satisfaction marriage women married early and not married early. On the women who married early quality of life aspects of social relations shows no influence with the value of the p-value of 0,000 (p>0.05). Social relations on the woman who married the most early in the category of just as many as 45 respondents (measured at 59.2%) with 2 respondents (2.6%) located on category are not satisfied and 43 respondents (56.6%) in the category satisfied. While the women who are not married early shows no influence with the value of the p-value of 0,523 (p>0.05). The quality of life of the aspects of social relations on the women who are not married early majority votes in the category of just as many as 33 respondents (43.4%) with 1 respondents (1.3%) located on category are not satisfied and 32 respondents (42.1%) in the category satisfied. Social support from the family is also a factor that will increase customer satisfaction marriage. Based on the research done Ayuningtyas (2015), stated that there is a relationship between social support and satisfaction of marriage, where the higher the support received and the higher customer satisfaction also his nuptials. The most influential social support is the support of the family and those closest to where the support of the family contributed 42.1% to customer satisfaction marriage which lived and will help reduce the pressure of stress on the individual concerned.

Based on the results of research it is known that there is no difference between the influence of the quality of life of environmental aspects of good marriage satisfaction in women who married early or not married early. On the women who married early quality of life aspects of environmental majority votes in the category of just as many as 51 respondents (67.1%) with 3 respondents (3.9%) located on category are not satisfied and 48 respondents (63.2%) in the category satisfied. While the women who are not married early quality of life aspects of the environment majority votes in the category of just as many as 33 respondents (43.4%) with 1 respondents (1.3%) located on category are not satisfied and 32 respondents (42.1%) in the category satisfied. The Habit with living conditions and the environment cause the majority of respondents felt satisfied with the marriage of her even though they are still not ideal environment. Most respondents was the original inhabitants of the region, so that they do not experience a significant change with the environment in which they live.

Based on the results of research it is known that there is no difference between the influence of the quality of life of good marriage satisfaction in women who married early or not married early. On the women who married early quality of life of the majority votes in the category of just as many as 57 respondents (75.0%) with 5
respondents (6.6%) located on category are not satisfied and 52 respondents (68.4%) in the category satisfied. While the women who are not married early quality of life of the majority votes in the category of just as many as 58 respondents (76.32%) with 1 respondents (1.3%) located on category are not satisfied and 57 respondents (75.0%) in the category satisfied. The quality of life of individuals with each other will be different, it depends on the definition or the interpretation of the individual about the good quality of life. While customer satisfaction focus on the level of comfort felt by the candidate in the share and receive information emotional and cognitive.

CONCLUSIONS

Based on the research done get some conclusions as follows:

There is no effect between the quality of life of the physical health aspects of the level of satisfaction in women early marriage with the value of the p-value of 0.217 (p>0.05).

There is no effect between the quality of life of psychological health aspects of the level of satisfaction in women early marriage with the value of the p-value of 0.484 (p>0.05).

There is the influence of the quality of life of the aspects of the social relations of the level of satisfaction in women early marriage with the value of the p-value of 0.000 (p<0.05).

There is no effect between the quality of life of environmental aspects of the level of satisfaction in women early marriage with the value of the p-value of 0.059 (p>0.05).

There is no effect between the quality of life of the level of satisfaction in women early marriage with the value of the p-value of 0.314 (p>0.05).

There is no effect between the quality of life of the physical health aspects of the level of satisfaction in women not early marriage with the value of the p-value of 0.362 (p>0.05).

There is no effect between the quality of life of psychological health aspects of the level of satisfaction in women not early marriage with the value of the p-value of 0.377 (p>0.05).

There is no effect between the quality of life of the aspects of the social relations of the level of satisfaction in women not early marriage with the value of the p-value of 0.523 (p>0.05).

There is no effect between the quality of life of environmental aspects of the level of satisfaction in women not early marriage with the value of the p-value of 0.457 (p>0.05).

There is no effect between the quality of life of the level of satisfaction in women not early marriage with the value of the p-value of 0.228 (p>0.05).

There is no difference between the influence of the quality of life of the physical health aspects of the level of marital satisfaction in women early marriage and not early marriage.

There is no difference between the influence of the quality of life of psychological health aspects of the level of marital satisfaction in women early marriage and not early marriage.

There is a difference between the influence of the quality of life of the aspects of the social relations of the level of marital satisfaction in women early marriage and not early marriage.

There is no difference between the influence of the quality of life of environmental aspects of the level of marital satisfaction in women early marriage and not early marriage.

There is no difference between the influence of the quality of life of the level of marital satisfaction in women early marriage and not early marriage.

Ethical Clearance: This study approved and received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study we followed the guidelines from the Committee of Public Health Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for ethical clearance and informed consent. The informed consent included the research title, purpose, participants’s right, confidentiality and signature.

Source of Funding: This study done by self funding from the authors.

Conflict of Interest: The authors declare that they
have no conflict interest.

REFERENCES


Diagnostic Accuracy of Procalcitonin as a Marker of Gram-Negative Bacteremia on Sepsis and Septic Shock Patients in Intensive Care Unit (ICU)

Syafri K Arif¹, Abdul Wahab¹, Syafruddin Gaus¹, Muh R Ahmad¹, Christa E Damongilala¹
¹Department of Anesthesiology, Intensive Care, and Pain Management, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia

ABSTRACT

Background: Prediction of pathogen’s species among sepsis and septic shock patients within hours would be helpful in accelerating proper treatment. A biomarker like PCT could be a potential method to decrease the time of identification & prevent antibiotic resistency.

Objectives: To assess the usefulness of procalcitonin (PCT) to predict blood culture (BC) results.

Method: The authors retrospectively analyzed data of sepsis and septic shock patients in ICU Dr.Wahidin Sudirohusodo Hospital from January 2015 to June 2016 with BC and PCT draw simultaneously in ≤ 24 hours. Kruskal-Wallis analysis was used for multi group comparisons. The diagnostic performance of PCT to predict gram-negative bacteremia was tested using a ROC curve.

Results: A total of 90 diagnostic episodes met the inclusion criteria. A significantly higher value of PCT was found in gram-negative BC (77.3 ng/mL, 0.43–200.01) than that in negative BC (50.15 ng/ml, 0.45-200.01) gram-positive BC (28.9 ng/mL, 0.75–200.01) or fungal BC (31.5 ng/mL, 30.33–32.62).

For gram-negative bacteremia identification in sepsis cut-off value ≥ 6.8ng/mL for PCT yielded sensitivity 77.3 %, specificity 58.6 %, PPV 58.6 %, NPV 77.2 % and AUC 0.655. In septic shock cut off value ≥50,82 ng/ml, Sensitivity 82,4 %, Specificity 63,6 %, PPV 63,6%, NPV 82,3%, AUC 0,713.

Conclusions: The diagnostic accuracy of PCT to predict gram-negative bacteremia is sufficient to good, it may be useful for differentiating gram-negative from gram-positive and fungal bloodstream infection with a significantly higher PCT level indicating gram-negative bacteremia. The high NPV may represent a useful tool to exclude the presence of gram-negative bacteremia to guide the empirical antimicrobial therapy

Keywords: Procalcitonin; Sepsis; Septic shock; Blood Culture; Gram-negative bacteremia.

INTRODUCTION

Sepsis merupakan salah satu penyebab kematian tersering pada pasien yang dirawat di rumah sakit. Kultur darah telah dianggap sebagai gold standard untuk deteksi infeksi bakteri dan merupakan salah satu prosedur dalam sepsis bundle (3 hour bundle). Kultur mikrobiologi konvensional sangat memakan waktu, diluar dari spesifisitas dan akurasianya. Perkiraan penundaan hasil dari kultur darah adalah antara 48-72 jam. Adapun, adanya tes biokimia yang dapat secara cepat memprediksi probabilitas dari hasil kultur darah dapat membantu terapi empirik antibiotik pada pasien sepsis dan mencegah resistensi antibiotik.¹²

Prokalsitonin merupakan prohormon kalsitonin dan disintesis oleh sel C pada kelenjar tiroid, diproduksikan sebagai respon terhadap endotoksin atau terhadap mediator yang dilepaskan sebagai respon terhadap infeksi bakteri. Prokalsitonin disintesis oleh sejumlah besar jaringan dan organ sebagai respon terhadap invasi patogen bakteri, fungi, dan parasit. Serum prokalsitonin merupakan peptida dari asam amino 116, dan peningkatan kadarnya diasosiasikan dengan
infeksi bakteri sistemik. Kadar prokalsitonin meningkat (hingga 5000 kali lipat) antara 2 sampai 4 jam pertama pada bentuk berat dari inflamasi sistemik atau pada infeksi bakteri mencapai kadar puncak dalam 6 jam, dan bertahan selama 24 jam setelah binatang coba sehat diinjeksi dengan endotoksin bakteri gram negatif. Waktu paruh biologisnya mencapai 22-26 jam, dimana hal ini merupakan hal yang menguntungkan bila dibandingkan dengan CRP atau penanda fase akut lainnya.3,4,5,6

PCT diproduksi sebagai respon terhadap endotoksin bakteri dan sitokin inflamasi pejamu, dan dapat membedakan infeksi bakteri dari infeksi virus. Telah diketahui bahwa bakteri gram positif atau gram negatif atau fungi mengaktivasi jalur Toll-like receptor (TLR) berbeda, yang menghasilkan produksi sitokin proinflamasi berbeda yang mengstimulasi pelepasan PCT. Hal ini menggambarkan bahwa jenis patogen yang berbeda dapat menghasilkan produksi kadar prokalsitonin yang berbeda juga. Hal ini dapat menjadi relevan dalam infeksi aliran darah, dimana PCT dapat membimbing klinisi dalam pemberian terapi awal yang tepat yang sangat penting untuk hasil akhir pasien.7,8

MATERIALS AND METHOD

Patients and samples

This was a retrospective observational analytic study and was approved by the Ethics Committee of dr. Wahidin Sudirohusodo Hospital. The authors reviewed the clinical records of all patients with a diagnosis of sepsis or septic shock from January 2015 to Juni 2016 and registered those in agreement with the diagnostic protocol consisting of a blood culture and measurement of serum PCT. The authors excluded the diagnostic episodes done on patients with missing tests and those not completed with an 24-hour time interval. Clinical and microbiologic data were obtained from the comprehensive electronic medical

Procalcitonin Assay

Plasma procalcitonin concentration was measured using automated immunofluorescent assays of procalcitonin in human plasma (EDTA, heparin) samples (Brahms PCT sensitive KRYPTOR kit for Brahms KRYPTOR, Hennigsdorf, Germany) according to the supplier’s protocol. The normal procalcitonin concentration was defined as <0.05 ng/mL according to supplier reference values.

Blood Culture.

For each sample, an 5 to 10mL whole blood was inoculated into BACTEC aerobic and anaerobic bottles (Becton Dickinson, Sparks, MD). BACTEC The bottles were incubated in a BACTEC FX automated blood culture system (Becton Dickinson). All bottles flagged positive were removed from the instrument and was taken for Gram-stain and culture on solid media for subsequent analysis. Identification of microorganisms was performed with conventional methods.

STATISTICAL ANALYSIS

The comparison of serum procalcitonin values across groups was performed using the Kruskal-Wallis test. A p-value 0.05 was considered statistically significant. The diagnostic performance of PCT was evaluated using a receiver operating characteristic curve, with AUC (Area Under the Curve) as the indicator of diagnostic accuracy. The cutoff value of PCT to predict gram-negative bacteremia was selected considering the sum of the highest sensitivity and specificity. Statistical analysis was performed using SPSS for Windows (version 11.5; SPSS Inc, Chicago, IL).

RESULTS

Characteristics of the study population and distributions of causative pathogen

Over 18 months, a total of 90 diagnostic episodes met the inclusion criteria, 51 sepsis and 39 septic shock. Overall, 55 (61,1 %) men and 35 (38,9 %) women were included. The mean age of the patients was 42.96 years.

There are 36 diagnostic episodes of negative BC and 54 of positive BC which consists of 39 gram negative bacteremia, 13 gram positive bacteremia, and 2 fungemia were included in this study.

Measurements of Procalcitonin

Serum PCT concentrations in patients with Gramnegative BC were significantly greater than in patients with negative BC, grampositive BC, or fungal (77.25 ng/ mL 50.15 ng/mL, 28.87 ng/mand 31.47 ng/ mL, respectively, P < 0.05) [Table 1].
Table 1. Comparison of PCT value according to BC results

<table>
<thead>
<tr>
<th>Variable</th>
<th>BC results</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procalcitonin</td>
<td>Negative BC</td>
<td>36</td>
<td>50.15</td>
<td>67.91</td>
<td>21.70</td>
<td>0.45</td>
<td>200.01</td>
</tr>
<tr>
<td></td>
<td>Gram negative BC</td>
<td>39</td>
<td>77.25</td>
<td>77.73</td>
<td>38.30</td>
<td>0.43</td>
<td>200.01</td>
</tr>
<tr>
<td></td>
<td>Gram positive BC</td>
<td></td>
<td>28.87</td>
<td>55.77</td>
<td>8.07</td>
<td>0.75</td>
<td>200.01</td>
</tr>
<tr>
<td></td>
<td>Fungal</td>
<td></td>
<td>31.47</td>
<td>1.61</td>
<td>31.47</td>
<td>30.33</td>
<td>31.47</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>9</td>
<td>58.40</td>
<td>71.69</td>
<td>27.39</td>
<td>0.43</td>
<td>200.01</td>
</tr>
</tbody>
</table>

*Kruskal-Wallis (p < 0.05)*

**Diagnostic accuracy of procalcitonin**

Receiver operating characteristic (ROC) analysis was performed to reveal the diagnostic accuracy of PCT concentrations to distinguish Gram-negative BC from negative BC, gram positive BC and fungal BC in shock and septic shock. In sepsis, an optimal PCT cutoff value of 6.8 ng/mL resulted in an AUC value of 0.655 (95% confidence interval [CI], 0.498–0.812, p > 0.05), sensitivity of 77.2%, specificity of 58.6%, PPV of 58.7%, and NPV of 77.3%. [Figure 1]

In shock septic an optimal PCT cutoff value of 50.8 ng/mL resulted in an AUC value of 0.713 (95% confidence interval [CI], 0.546–0.879, p < 0.05), sensitivity of 82.4%, specificity of 63.6%, PPV of 63.7%, and NPV of 82.4%. [Figure 1]

Table 2. Results of Measurements of Procalcitonin

<table>
<thead>
<tr>
<th>(ROC curve) PCT best cut off</th>
<th>(a) 6.8 ng/ml</th>
<th>(b) 50.8 ng/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>77.2%</td>
<td>82.4%</td>
</tr>
<tr>
<td>Specificity</td>
<td>58.6%</td>
<td>63.6%</td>
</tr>
<tr>
<td>PPV</td>
<td>58.7%</td>
<td>63.7%</td>
</tr>
<tr>
<td>NPV</td>
<td>77.3%</td>
<td>82.4%</td>
</tr>
</tbody>
</table>

Figure 1. Diagnostic accuracy of procalcitonin

Figure 1. Receiver operating characteristic (ROC) curves of different cut-offs of PCT as a marker of gram-negative bacteremia in: (a) Sepsis patients (AUC 0.655, 95% CI 0.498–0.812; P > 0.05); (b) Septic shock patients (AUC 0.713, 95% CI 0.546–0.879, P < 0.05). Sensitivity, Specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV) are reported for the best cut-off values found in each ROC.
DISCUSSION

Pada penelitian ini didapatkan didapatkan hasil 54 kultur positif (60 %) dan 36 kultur negatif (40 %), hal ini tidak sesuai dengan literatur yang menyatakan bahwa hasil kultur darah positif adalah 30 % dari total keseluruhan kultur darah.\textsuperscript{9}Dari 54 kultur darah positif didapat 39 kuman gram negatif, 13 kuman gram positif, dan 2 jamur, hal ini sesuai dengan literatur yang menyatakan bahwa kuman gram negatif merupakan jenis kuman tersering yang menyebabkan terjadinya sepsis.\textsuperscript{7,8}

Pada penelitian ini ditemukan mean prokalsitonin yang lebih tinggi secara signifikan pada hasil kultur gram negatif, dibandingkan dengan pada hasil kultur gram positif, bakteri gram positif , atau jamur. Hal ini disebabkan karena adanya perbedaan dari kuman gram negatif, gram positif, dan jamur dalam inisiasi kaskade inflamasi, dimana pola lipopolisakarida (LPS) pada gram negatif dapat mengaktivasi neutrofil melalui Toll like receptor 4 (TLR-4), dan asam lipoteikoik pada bakteri gram positif bekerja melalui TLR-2. Toll like receptor mengaktivasi pemici kaskade inflamasi yang menyebabkan terjadinya sintesis sitokin pro inflamasi dan protein fase akut. Bakteri Gram negatif meningkatan produksi Tumor necrosis factor α (TNF-α) lebih daripada infeksi gram positif. Perbedaan juga ditemukan pada level plasma interleukin (IL)-1, IL-6, IL-10, dan IL-8. Hal ini yang menyebabkan bakteremia gram negatif menyebabkan respons inflamasi yang lebih besar daripada bakteri gram positif.\textsuperscript{8}

Pada penelitian ini, dengan kurva ROC didapatkan prokalsitonin memiliki sensitivitas 77,2 %, spesifisitas 58,6 %, Nilai duga positif 58,7 %, nilai duga negatif 77,3 %, dengan cut off value ≥ 6,8 ng/ml pada area under the curve (AUC) 0,655 yang berarti prokalsitonin memiliki akurasi diagnostik yang cukup (0,6-0,7) sebagai penanda kuman gram negatif pada hasil kultur darah pasien sepsis. Cut off value PCT pada penelitian ini hampir sama dengan yang diperoleh pada penelitian cohort yang dilakukan Shu Yuan Guo (2015) yang mendapatkan cut off value PCT 6,47 ng/ml sebagai penanda bakterimia gram negatif pada pasien sepsis namun dengan sensitivitas, spesifisitas dan nilai duga negatif yang lebih tinggi (74%, 81 %, 82%).\textsuperscript{10}

Dengan kurva ROC didapatkan Sensitivitas 82,4 %, spesifisitas 63,6 %, Nilai duga positif 63,7 %, Nilai duga negatif 82,3 % dengan AUC 0,713 yang berarti PCT memiliki nilai akurasi diagnostik yang baik (0,7-0,8) sebagai penanda bakterimia gram negatif pada pasien syok sepsis. Adapun penelitian yang meneliti tentang akurasi diagnostik prokalsitonin sebagai penanda bakterimia gram negatif pada pasien syok sepsis belum pernah dilakukan sebelumnya..

Nilai Duga Negatif (NDN) prokalsitonin yang tinggi untuk deteksi bakteri gram negatif pada kultur darah dapat menjadi alat yang berguna untuk eksklusi adanya bakteri gram negatif dan menentun rejimen terapi antimikroba empiris pada pasien sepsis dan syok sepsis untuk mengurangi biaya perawatan dan mengoptimalkan terapi.\textsuperscript{37}

Kekurangan dari penelitian ini yaitu desain penelitian retrospektif cross-sectional butuh validasi dari studi prospektif longitudinal, kecilnya jumlah sampel, tidak diikuti dengan banyak jenis kultur yang lain, kurangnya jumlah populasi jamur, dan populasi gram negatif yang dua kali lebih banyak jumlahnya dari gram positif yang dapat menyebabkan terjadinya bias seleksi.

CONCLUSIONS

Base on the finding it can be concluded that the diagnostic accuracy of PCT to predict gram-negative bacteremia is sufficient to good, it may be useful for differentiating gram-negative from gram-positive and fungal bloodstream infection with a significantly higher PCT level indicating gram-negative bacteremia. The high NPV may represent a useful tool to exclude the presence of gram-negative bacteremia to guide the empirical antimicrobial therapy.

Conflict of Interest: Author declare that there is no conflict of interest on this research and publication.

Source of Funding : This research was financed by authors.

REFERENCES

3. Tang BM, Eslick GD, Craig JC, McLean AS. Accuracy of procalcitonin for sepsis diagnosis in


10. Shun Yuan Guo, MD, Yin Zhou, MD, Qing Feng Hu, PhD, Jiong Yao, PhD and Hong Wang, MD in Patients With Sepsis Procalcitonin Is a Marker of Gram-Negative Bacteremia The American Journal of the Medical Sciences Volume 349, Number 6, June 2015
Factors of Skipping Breakfast and Association between Skipping Breakfast and Academic Achievement of Nursing Students

Pratiti Haldar¹, Baby S Nayak², Yashodha Satish³

¹M.Sc Nursing Student, ²Professor, ³Assistant Professor, Department of Child Health Nursing, Manipal College of Nursing Manipal, Manipal Academy of Higher Education, Manipal, Karnataka, India

ABSTRACT

Background: Breakfast eating is related with good outcomes in terms of health. Skipping of breakfast is usually found in adolescents, but research findings on the effects of breakfast skipping on academic performance are scarce. The current study investigated the relation between breakfast skipping and academic performance of nursing students.

Aims & Objective: To identify the factors associated with breakfast skipping and assess the academic achievement and to find association between breakfast skipping and academic performance

Materials and Method: Cross-sectional survey was done among 527 nursing students. Demographic data of the subjects, and data related to factors for skipping breakfast was collected. Sessional grades of two exams were collected. Immediate visual memory and focus test was conducted via tool designed by researchers.

Results: The results revealed, majority of the students 215 (40.7%) lack of time was the major reason to skip breakfast. Most of the 522 (99.1%) students scored good in the immediate visual memory (IMV) test and 500 (94.9 %) scored well in the focus test. No significant association ($\chi^2$ (3) = 1.902, p = 0.595) was found between breakfast skipping and academic performance.

Conclusion: Breakfast is generally accepted to be the most important meal of the day and students should eat breakfast regularly especially when they are going to hospitals. As per the data findings, no association was found between skipping of breakfast and academic achievements. Thus, the study indicates that breakfast skipping does not affect academic achievement but in a longer run it might affect the cognitive levels of students if regularly skipped.

Keywords: Breakfast eating, Breakfast skipping, immediate visual memory, focus test Nursing students, Academic achievement.

INTRODUCTION

The primary necessity for life is food and life cannot be sustained without adequate amount of nutrition.

Author for Correspondence:
Dr. Baby S Nayak, Professor, Child Health Nursing Department, Manipal College of Nursing Manipal, Manipal Academy of Higher Education. Madahv Nagar Manipal - 576401, Karnataka. India. email id: baby.s@manipal.edu, babynayak70@gmail.com

Procuring enough food for survival is the main aim of life’s struggle in all the higher organisms¹. If the term breakfast is split it means, “Breaking the fast” which helps to fuel our body with nutrients so that the daily activities can be carried out. If the breakfast is healthy then lethargy, craving for sugar, pangs of hunger at unusual time and nutritional deficiencies can be prevented ².

Health is wealth, is a saying and is true. As said, prevention is better than cure, a large number of diseases can be prevented with little or no medical
intervention if people are adequately informed about likely complications and encouraged to take necessary precautions in time. Many researchers over the decades have suspected and proved association between consumption of breakfast and academic performance, even though the reasons for cognitive consequences were not completely investigated neither understood.

Breakfast consumption is consistently associated with general health outcomes and acute measures of concentration and cognitive function. Nutrition is a major factor in bringing out the maximum potentiality that one is endowed with both physically and mentally.

The beneficial effects of eating breakfast on cognitive performance are expected to be short term and specific to the morning on which breakfast is eaten and to selective cognitive functions. These immediate or acute effects might translate to benefits in academic performance with habitual or regular breakfast consumption, but this has not been evaluated in most studies.

Skipping the breakfast has been associated with adverse effects on cognitive function (including memory), academic performance, school attendance, psychosocial function, and mood in children and young people. Those people who skipped breakfast are reported to have higher daily intakes of fat, cholesterol, and energy, and lower intakes of fiber, vitamins, and minerals in comparison to breakfast eaters, thereby increasing the likelihood of gastrointestinal disease later in life.

The present study investigated various factors of breakfast skipping and also assessed the influence of skipping breakfast on academic achievement of nursing students.

MATERIALS AND METHOD

Study design, Population and Sampling Technique

A cross sectional survey was carried out among 527 nursing students in the age group of 18 to 35 years studying in selected Nursing Colleges of Udupi District, Karnataka using enumerate sampling technique.

TOOLS AND PROCEDURE

The tool consisted of demographic proforma, raking scale on factors influencing breakfast skipping and an academic achievement assessment scale which consisted of marks records, immediate recall memory and focus test. To assess academic achievement, marks for two sessional exams was collected from the records and the average of both the exams was taken. Academic performance was categorized as – Distinction > 75%, First Class = 60 – 75 %, Pass = 50 – 60 and Fail = < 50% as per university grading criteria. The students were asked to sit in a classroom where information on the study was provided and informed consent was taken. The data was collected in three stages:

Stage 1: Immediate visual memory test was conducted for two minutes. In the first one minute 16 images were shown and then the students were asked to write down the images by recalling in one minute. The total score of the immediate visual memory test was 16. According to arbitrary classification score was classified as: Good performance = >8 and Poor performance = <8.

Stage 2: Focus test of five minutes duration was conducted followed by immediate visual memory test in which the students were asked to find 20 differences in the image given, the first image was the correct image and the second image had 20 missing items. The total score for focus test was 20 and according to arbitrary classification it was classified as: Good performance = >10 and Poor performance = <10.

Stage 3: After the focus test, data regarding factors for skipping breakfast was collected by ranking ranging from one to eight based on priority. One being of highest priority and eight being lowest priority.

The data was collected before 10:00 am to identify the impact of skipping breakfast on test. 527 students participated in the study.

FINDINGS

Section 1: Description of sample characteristics

The data was collected from 527 samples studying in Manipal College of Nursing, Manipal of Manipal University. Frequency and percentage was computed for describing the sample characteristics and is shown in Table 1.

The data presented in Table 1 show that, a maximum number of 354 (67.2%) students who participated in the study were from B.Sc. Nursing. Majority of the 312 (59.2%) students were hostellers. A maximum number of 389 (73.8%) students’ family income was above Rs.
Most of the 510 (96.8%) students were non-vegetarians. Most of the 480 (91.1%) students did not use to consume any type of medications.

**Section II: Description of factors for skipping breakfast**

This section deals with the identification of factors influencing breakfast skipping and consists of two sections: Reasons for skipping and students’ perception towards breakfast eating.

**Section II A: Reasons for skipping breakfast**

The reasons for breakfast skipping was measured using rank order scale which had nine factors and ranking was from 1 to 9 on the basis of individual priority. Item wise rank is described in terms of frequency and percentage in Table 2.

The data presented in Table 2 shows that a maximum number of 215 (40.7%) students’ reason for skipping breakfast was lack of time in the morning whereas for only 7 (1.3%) students’ cost was the reason to skip breakfast.

**II B: Description of perception towards breakfast eating**

The perception towards breakfast eating was measured as a subscale in factors influencing breakfast skipping. The tool was categorized as: always, sometimes and never. Item wise frequency and percentage distribution is described in Table 3.

The data distribution presented in Table 3 shows that most of the 363 (68.9%) students feel that breakfast is not an important meal of the day.

Based on the responses given by the students on the Likert scale the data was interpreted as shown in the Figure 1.

The data presented in Figure 1 shows that a majority 414 (79%) were having good perception towards eating breakfast.

**Section III: Description of academic achievement**

Academic achievement was assessed by taking the average of percentage of marks obtained by the students in the first and second sessional examinations through records and also by conducting immediate memory and focus test.

The average of percentages achieved in two sessional examinations by the students is described in Figure 2 and frequency and percentage distribution of marks achieved in immediate visual memory and focus test is described in Table 4.

**III A: Frequency and percentage of distribution of sessional marks**

The percentage of marks obtained by the students in the first and second sessional examinations is described in Figure 2 and is categorized in the first, second, third and fail.

The percentage of marks obtained by the students in the first and second sessional examinations is described in Figure 2 and is categorized in distinction, first, pass, third and fail.

Distinction = > 75%
First = 60 – 75%
Pass = 50 – 60%
Fail = < 50%

The data distribution presented in Figure 2 shows that a maximum number of 191 (25%) students were in the first rank category and only 54 (10%) had distinction in the sessional exams.

**III B: Immediate visual memory and focus test**

The maximum marks obtained by the students in the immediate visual memory were 16. According to the arbitrary classification it was classified into two categories:

Good performance = >8
Poor performance = <8

The total score for focus test was 20. According to the arbitrary classification it was classified into two categories according to their performance:

1. Good performance = >10
2. Poor performance = <10

The Immediate Visual Memory and focus test is described in Table 4.

The data distribution presented in Table 4 shows
that most of the students scored good 522 (99.1%) in the immediate visual memory test and a majority of the 500 (94.9 %) students scored good in the focus test.

Section IV: Association between breakfast skipping and academic achievement

To find the association between breakfast skipping and the academic achievement the data collected was divided into two subparts which includes: collection of sessional grades through records and conduction of immediate visual memory and focus test.

Section IV A: Association between breakfast skipping and sessional grades

To find the association marks of two sessional examinations was collected from the records and categorized into: distinction, first, pass and fail. The association between breakfast skipping and sessional grades is shown in Table 5.

The chi square values presented in Table 5 reveals that there is no significant association ($\chi^2 = 1.902, p = .595$) between sessional grades and breakfast skipping at .05 level.

Section IV B: Association between breakfast skipping and immediate visual memory and focus test

To find the association the test was categorized into two i.e. good and poor based on the performance of the students in the test which was based on the marks obtained by the individual student. The association between breakfast skipping and immediate visual memory is shown in Table 6.

The chi square values presented in Table 6 reveals that there is no significant association between immediate visual memory ($\chi^2 = 0.106, p = .744$) and the focus test ($\chi^2 = 0.788, p = .375$) and breakfast skipping at .05 level.

Table 1: - Distribution of the subjects based on demographic variables.   n = 527

<table>
<thead>
<tr>
<th>Sample characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.Sc. Nursing</td>
<td>354</td>
<td>67.2</td>
</tr>
<tr>
<td>GNM Nursing</td>
<td>173</td>
<td>32.8</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>39</td>
<td>7.4</td>
</tr>
<tr>
<td>Female</td>
<td>488</td>
<td>92.6</td>
</tr>
<tr>
<td><strong>Place of stay</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>215</td>
<td>40.8</td>
</tr>
<tr>
<td>Hostel</td>
<td>312</td>
<td>59.2</td>
</tr>
<tr>
<td><strong>Total Income (in rupees)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 5,000</td>
<td>19</td>
<td>3.6</td>
</tr>
<tr>
<td>5,001 -10,000</td>
<td>119</td>
<td>22.6</td>
</tr>
<tr>
<td>Rs. 10000 &amp; Above</td>
<td>389</td>
<td>73.8</td>
</tr>
<tr>
<td><strong>Diet type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non vegetarian</td>
<td>510</td>
<td>96.8</td>
</tr>
<tr>
<td>Vegetarian</td>
<td>17</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Medication intake (daily)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>47</td>
<td>8.9</td>
</tr>
<tr>
<td>No</td>
<td>480</td>
<td>91.1</td>
</tr>
</tbody>
</table>

** Part of table presented
Table 2: Frequency and percentage distribution on reasons for skipping breakfast  n = 518

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of time</td>
<td>215</td>
<td>40.8</td>
</tr>
<tr>
<td>Lack of food variety</td>
<td>65</td>
<td>12.3</td>
</tr>
<tr>
<td>Lack of appetite</td>
<td>61</td>
<td>11.6</td>
</tr>
<tr>
<td>Do not feel like eating</td>
<td>48</td>
<td>9.1</td>
</tr>
<tr>
<td>Lack of company</td>
<td>26</td>
<td>4.9</td>
</tr>
<tr>
<td>Self-esteem of getting overweight</td>
<td>26</td>
<td>4.9</td>
</tr>
<tr>
<td>Cost</td>
<td>24</td>
<td>4.6</td>
</tr>
<tr>
<td>Convenience</td>
<td>7</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Table 3: Frequency and percentage distribution on perception towards breakfast eating  n= 527

<table>
<thead>
<tr>
<th>Statements</th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency/Percentage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast is the most important meal</td>
<td>23</td>
<td>141</td>
<td>363</td>
</tr>
<tr>
<td>Work efficiency difference when skipped</td>
<td>60</td>
<td>301</td>
<td>166</td>
</tr>
</tbody>
</table>

Table 4: Frequency and percentage distribution on scores of immediate visual memory and focus test  n = 527

<table>
<thead>
<tr>
<th>Test</th>
<th>Good</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate visual memory</td>
<td>522</td>
<td>99.1</td>
</tr>
<tr>
<td>Focus</td>
<td>500</td>
<td>94.9</td>
</tr>
</tbody>
</table>

Table 5: Association between breakfast skipping and Sessional grades of the Nursing students  n = 527

<table>
<thead>
<tr>
<th>Variables</th>
<th>Distinction</th>
<th>First</th>
<th>Pass</th>
<th>Fail</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast skippers</td>
<td>28</td>
<td>106</td>
<td>74</td>
<td>70</td>
<td>1.902</td>
<td>3</td>
<td>0.595</td>
</tr>
<tr>
<td></td>
<td>(10.1%)</td>
<td>(38.1%)</td>
<td>(26.6%)</td>
<td>(25.2%)</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>Breakfast non skippers</td>
<td>26</td>
<td>85</td>
<td>79</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(10.4%)</td>
<td>(34.1%)</td>
<td>(31.7%)</td>
<td>(23.8%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*NS = Non Significant
Skipping breakfast has become norm in modern day India because of changes in family lifestyle. When this happens largely among children, it can result in their suboptimal growth and development – a factor important to the future human resource development of the country. In the present study, the leading reason for skipping breakfast was lack of time in the morning and it is supported by a study conducted by Gajre, Fernandez, Balakrishna, Vazir (2008) which reported that, lack of time (46.1%) was the leading cause for skipping breakfast. Nursing students need to report to their clinical before 8am and might be the reason for skipping breakfast in the present study.

In the present study, there was no significant association found between breakfast eating and academic achievement. Contrary to the findings, study conducted by Garg, Rajesh, Kumar (2014) among school children reported that regular breakfast eaters achieved higher academic achievement scores than the group of breakfast skippers.

**CONCLUSION**

Skipping breakfast is increasing among students of all age groups and even in adults. The patterns of skipping varies from individual to individual. The findings of present study suggest that skipping breakfast does not affect the performance of students in academics but the reasons can be multi factorial (e.g. stress, anxiety, less attention span, low IQ, home sickness etc.) but if on a longer run students regularly skip breakfast it will lead to deficiency of nutrients which is required by brain after prolong fasting throughout night and directly or indirectly affect our cognitive functions as supported by many research studies. Related studies like 24 hour dietary recall or food frequency questionnaire for diet intake calculation or retrospective study with a larger group can be done to identify the main factors of skipping breakfast.

**Conflict of Interest:** None declared

**Source of funding:** Self

**Ethical Clearance:** Ethical clearance was obtained from Institutional Research Committee and Institutional Ethics committee.
REFERENCES


A Study to Assess Knowledge, Attitude and Practices Regarding Tuberculosis among 18 Year and above Patients Attending CHC Hapur

Akhilesh Kumar Malhotra¹, P N Bhise², Sandhya Nirmal Bhise³
¹Associate Professor; ²Professor and Head of Deptt., ³Health Educator, Deptt. of Community Medicine, Rama Medical College Hospital and Research Centre, Hapur UP

ABSTRACT

Aims and Objectives. To assess the knowledge, attitudes and practices regarding tuberculosis among patients attending CHC Hapur.

Method- A crosssectional study was conducted during Feb 2017 among 463 patients attending CHC Hapur. Information was collected with reference to knowledge, attitude and practices regarding tuberculosis. Univariate analysis was done to assess statistical significance of association of various socio-demographic factors and awareness regarding tuberculosis.

Results- A total of 463 patients was included in study. Communication with Doctors(27.9%) and health workers(22.5%) was most common source of information. Cough for 2 weeks(49.5%) was most common symptom mentioned. Majority of respondents knew that TB is a air-borne infection(69.5%) and can be prevented by covering mouth and nose while coughing(68.4%). 90.3% of respondents believe that TB can be cured with the help of Doctor and 67.4% were aware that drugs for Tb were available free of cost from Govt. set up. Majority of respondents were ignorant about impact of HIV on Tuberculosis(80.3%). Misconception such as shaking hand as a route of spread is also prevalent in community(12.7%) Proportion of respondents having correct knowledge regarding tuberculosis was more in 18-25 yr age group, females, respondents with higher literacy status and urban domicile. Literacy status is significantly related to knowledge regarding tuberculosis.

Conclusion- Community based health education programmes is needed to create awareness regarding TB and remove myths sp in poor and illiterate people.

Keywords- Knowledge, attitude, practices, tuberculosis, literacy.

INTRODUCTION

Tuberculosis is an important public health problem in India. India has the highest burden of both TB and MDR TB in the World. India bears the second highest number of HIV –associated TB in the world. Tuberculosis poses formidable challenge to public health. In India, the incidence of TB is 217 per lakh population per year in 2015 and mortality due to TB is 36 per lakh per year in 2015. Social determinants of health like malnutrition, poverty, illiteracy, lack of awareness, ill-ventilated housing are important obstacles to control of TB. The stigma, discrimination and misconception can contribute to poor patient compliance. The correct knowledge regarding TB disease and access to health services can assist in improving TB Control.
The Present Study is Conducted to assess Knowledge, Attitude and practices regarding tuberculosis among 18 years and above old patients attending OPD of CHC Hapur.

**MATERIALS AND METHOD**

A facility based cross-sectional study was carried out during Feb 2017 among patients attending CHC Hapur. Patients was interviewed using predesigned and pretested questionnaire. The questionnaire contains details of socio-demographic characteristics of respondents and KAP regarding TB

463 Patients aged 18 years and above were included in the study. Oral consent was obtained from all the participant before obtaining data.

The required sample size calculated using the formula required for determination of sample size for estimating single proportion. Based on the assumption that 50% of the study participants had high level of knowledge of TB with additional assumption of 95% confidence interval, 5% margin of error, and 10% non response rate in our estimate total minimum sample of 422 was needed

For each TB knowledge question score of 2 is given for correct answer, 1 is given for partially correct answer and 0 is given for incorrect answer or do not know response. Responses were taken as correct information when score is more than 50% of total score.

Data thus gathered was analyzed using SPSS software version 16. Statistical test of significance (chi-square test) was applied wherever found necessary.( p<0.05 was considered statistically significant).

**RESULTS**

Demographic characteristics of study population was depicted in table 1. Majority of respondents (61.5%) belongs to 18-35 years age group. 38.2% were illiterates. 44.1% were males and approx. 2/3 rd resides in rural area.

Distribution of subject according to their source of infection was given in table 2. Communication with Doctors (27.9%) and Health Workers (22.5%) was main source of information. Communication with family and friends (19.6%) were next important source of information.

As shown in table 3 Commonest symptom mentioned by respondents were cough for 2 weeks(49.5%) and cough of any duration(41.4%). More than 90% were not aware of loss of weight( 91.8%) and fever (95.7%) as a symptom of TB. 11.9% were ignorant.

As depicted in Table 4, Majority of respondents(69.5%) knew that TB is transmitted by polluted air in which TB patients Coughs. 20.5% were ignorant. 12.7%, 4.7% and 3.2% has misconception that TB is transmitted by shaking hands, contaminated water and sharing utensils respectively.

As given in table 5 majority of respondent(68.4%) knew that TB is prevented by covering mouth and nose while coughing. 20.7% of respondent were ignorant. 14% and 4.7% have misconception that TB is prevented by avoiding shaking hands with TB patients and drinking clean water respectively.

Majority of respondents(80.3%) were ignorant about impact of HIV on Tuberculosis. 17.5% of respondents knew that Chances of TB increases in HIV patients. 2.2% of respondents had misconception that chances of TB decreases in HIV patients.

Table 6 depicts that 90.3% of respondents believe that TB can be cured with the help of Doctor. 7.8% of respondents were ignorant about the treatment of TB. 1.7% said that TB can be cured by resting at home. 67.4% of respondents were aware that drugs for TB is available free of cost from Govt. setup.

As depicted in table 7, 8, 9, and 10

Proportion of respondents having correct knowledge regarding tuberculosis is maximum in 18-25 yr age group (76.5%) and minimum in 35-45 yr age group (60.8%). Age is not significantly related to Knowledge regarding tuberculosis (P value> 0.05).

Higher proportion of females (71%) having correct knowledge regarding tuberculosis as compared to males(65.7%). This observation is not statistically significant( p value>0.05).

Proportion of respondents having correct knowledge regarding tuberculosis was better in respondents with higher literacy status as compared to illiterates or just literates. Literacy status was significantly related to Knowledge regarding tuberculosis ( p value< 0.05)
Higher proportion of respondents with urban domicile (70%) having correct knowledge regarding tuberculosis as compared to rural domicile (67%). This observation is not statistically significant (p value>0.05).

Table-1 Demographic characteristics of study population

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Age Group</th>
<th>Frequency</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>18-25 years</td>
<td>145</td>
<td>31.3</td>
</tr>
<tr>
<td>2.</td>
<td>25-35 years</td>
<td>140</td>
<td>30.2</td>
</tr>
<tr>
<td>3.</td>
<td>35-45 years</td>
<td>69</td>
<td>14.9</td>
</tr>
<tr>
<td>4.</td>
<td>45-55 years</td>
<td>62</td>
<td>13.4</td>
</tr>
<tr>
<td>5.</td>
<td>55-65 years</td>
<td>31</td>
<td>6.7</td>
</tr>
<tr>
<td>6.</td>
<td>65 years and above</td>
<td>16</td>
<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>463</td>
<td>100</td>
</tr>
</tbody>
</table>

2. GENDER

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Frequency</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Male</td>
<td>204</td>
<td>44.1</td>
</tr>
<tr>
<td>2.</td>
<td>Female</td>
<td>259</td>
<td>55.9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>463</td>
<td>100</td>
</tr>
</tbody>
</table>

3. LITERACY LEVEL

<table>
<thead>
<tr>
<th></th>
<th>Literacy Level</th>
<th>Frequency</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Illiterate</td>
<td>177</td>
<td>38.2</td>
</tr>
<tr>
<td>2</td>
<td>Primary school/just literate</td>
<td>32</td>
<td>6.9</td>
</tr>
<tr>
<td>3</td>
<td>Middle school</td>
<td>47</td>
<td>10.2</td>
</tr>
<tr>
<td>4</td>
<td>High School</td>
<td>103</td>
<td>22.2</td>
</tr>
<tr>
<td>5</td>
<td>Intermediate/ diploma</td>
<td>65</td>
<td>14.2</td>
</tr>
<tr>
<td>6</td>
<td>Graduate</td>
<td>31</td>
<td>6.7</td>
</tr>
<tr>
<td>7</td>
<td>Post graduate professional</td>
<td>8</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>463</td>
<td>100</td>
</tr>
</tbody>
</table>

4. RESIDENCE

<table>
<thead>
<tr>
<th></th>
<th>Residence</th>
<th>Frequency</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rural</td>
<td>301</td>
<td>65</td>
</tr>
<tr>
<td>2</td>
<td>Urban</td>
<td>162</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>463</td>
<td>100</td>
</tr>
</tbody>
</table>

Table-2 Distribution of study subjects according to source of information about TB

<table>
<thead>
<tr>
<th>S.n.</th>
<th>Source of information</th>
<th>Frequency</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Religious leader</td>
<td>3</td>
<td>0.6%</td>
</tr>
<tr>
<td>2</td>
<td>Health worker</td>
<td>129</td>
<td>27.9%</td>
</tr>
<tr>
<td>3</td>
<td>Doctor</td>
<td>104</td>
<td>22.5%</td>
</tr>
<tr>
<td>4</td>
<td>Family and friends</td>
<td>91</td>
<td>19.6%</td>
</tr>
<tr>
<td>5</td>
<td>Poster/ pamphlets</td>
<td>41</td>
<td>8.9%</td>
</tr>
<tr>
<td>6</td>
<td>News paper</td>
<td>45</td>
<td>9.7%</td>
</tr>
<tr>
<td>7</td>
<td>TV</td>
<td>65</td>
<td>14%</td>
</tr>
<tr>
<td>8</td>
<td>Others**</td>
<td>2</td>
<td>0.4%</td>
</tr>
<tr>
<td>9</td>
<td>No information</td>
<td>42</td>
<td>9.1%</td>
</tr>
</tbody>
</table>

*Variable allowed for more than one response

**Others include book, training

Table 3 Knowledge on symptom of tuberculosis

<table>
<thead>
<tr>
<th>S.n.</th>
<th>Symptom</th>
<th>Frequency</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cough of any duration</td>
<td>192</td>
<td>41.4%</td>
</tr>
<tr>
<td>2</td>
<td>Cough for 2 weeks</td>
<td>229</td>
<td>49.5%</td>
</tr>
<tr>
<td>3</td>
<td>Blood in sputum</td>
<td>88</td>
<td>19%</td>
</tr>
<tr>
<td>4</td>
<td>Loss of weight</td>
<td>38</td>
<td>8.2%</td>
</tr>
<tr>
<td>5</td>
<td>Fever</td>
<td>20</td>
<td>4.3%</td>
</tr>
<tr>
<td>6</td>
<td>Don’t Know</td>
<td>55</td>
<td>11.9%</td>
</tr>
</tbody>
</table>

*Variable allowed for more than one response

Table 4 Knowledge on Mode of transmission of disease

<table>
<thead>
<tr>
<th>S.n.</th>
<th>Mode of transmission</th>
<th>Frequency</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shaking hands</td>
<td>59</td>
<td>12.7</td>
</tr>
<tr>
<td>2</td>
<td>Polluted air in which Tb pts Coughs</td>
<td>322</td>
<td>69.5</td>
</tr>
<tr>
<td>3</td>
<td>Contaminated water</td>
<td>22</td>
<td>4.7</td>
</tr>
<tr>
<td>4</td>
<td>Sharing utensils</td>
<td>15</td>
<td>3.2</td>
</tr>
<tr>
<td>5</td>
<td>Don’t Know</td>
<td>95</td>
<td>20.5</td>
</tr>
</tbody>
</table>

*Variable allowed for more than one response
Table 5: Perception about prevention of TB

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shaking hands</td>
<td>65</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>Cover mouth and nose while coughing</td>
<td>317</td>
<td>68.4</td>
</tr>
<tr>
<td>3</td>
<td>Drink clean water</td>
<td>22</td>
<td>4.7</td>
</tr>
<tr>
<td>4</td>
<td>Good nutrition</td>
<td>28</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Worshipping GOD</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>6</td>
<td>Don’t know</td>
<td>96</td>
<td>20.7</td>
</tr>
</tbody>
</table>

*Variable allowed for more than one response*

Table 6: Perception About how TB can be cured

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Doctor</td>
<td>418</td>
<td>90.3%</td>
</tr>
<tr>
<td>2</td>
<td>Rest At Home</td>
<td>8</td>
<td>1.7%</td>
</tr>
<tr>
<td>3</td>
<td>Ojha/magic</td>
<td>1</td>
<td>0.2%</td>
</tr>
<tr>
<td>4</td>
<td>Don’t know</td>
<td>37</td>
<td>7.8%</td>
</tr>
</tbody>
</table>

Table 7: Knowledge about tuberculosis in relation to Age

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Age(yrs)</th>
<th>Correct information (percentage)</th>
<th>Incorrect or no information (percentage)</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18-25</td>
<td>111(76.5)</td>
<td>34(23.5)</td>
<td>145(100)</td>
<td>P &gt;0.05(x^2 =8.172,df=5,p=0.147)</td>
</tr>
<tr>
<td>2</td>
<td>25-35</td>
<td>94(67.1)</td>
<td>46(32.9)</td>
<td>140(100)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>35-45</td>
<td>42(60.8)</td>
<td>27(39.2)</td>
<td>69(100)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>45-55</td>
<td>38(61.3)</td>
<td>24(38.7)</td>
<td>62(100)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>55-65</td>
<td>21(67.7)</td>
<td>10(32.3)</td>
<td>31(100)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>65 and above</td>
<td>12(75)</td>
<td>4(25)</td>
<td>16(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>318(68.7)</td>
<td>145(31.3)</td>
<td>463(100)</td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Knowledge about tuberculosis in relation to gender

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Gender</th>
<th>Correct information (percentage)</th>
<th>Incorrect or no information (percentage)</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>134(65.7)</td>
<td>70(34.3)</td>
<td>204(100)</td>
<td>P &gt;0.05(x^2 =1.522,df=1,p=0.217)</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>184(71)</td>
<td>75(29)</td>
<td>259(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>318(68.7)</td>
<td>145(31.3)</td>
<td>463(100)</td>
<td></td>
</tr>
</tbody>
</table>

Table 9: Knowledge about tuberculosis in relation to literacy status

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Literacy status</th>
<th>Correct information (percentage)</th>
<th>Incorrect or no information (percentage)</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Illiterate</td>
<td>110(62.1)</td>
<td>67(37.9)</td>
<td>177(100)</td>
<td>P &lt;0.05(x^2 =13.300,df=6,p=0.039)</td>
</tr>
</tbody>
</table>
Table 9: Knowledge about tuberculosis in relation to literacy status

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Literacy Status</th>
<th>Correct Information</th>
<th>Incorrect or No Information</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Primary school/just literate</td>
<td>17(53.1)</td>
<td>15(46.9)</td>
<td>32(100)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Middle School</td>
<td>34(72.3)</td>
<td>13(27.7)</td>
<td>47(100)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>High school</td>
<td>76(73.8)</td>
<td>27(26.2)</td>
<td>103(100)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Intermediate/ diploma</td>
<td>51(78.5)</td>
<td>14(21.5)</td>
<td>65(100)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Graduate</td>
<td>23(74.2)</td>
<td>8(25.8)</td>
<td>31(100)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Post Graduate/ professional</td>
<td>7(87.5)</td>
<td>1(12.5)</td>
<td>8(100)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Total</td>
<td>318(68.7)</td>
<td>145(31.3)</td>
<td>463(100)</td>
<td></td>
</tr>
</tbody>
</table>

Table 10: Knowledge of Tuberculosis in relation to domicile

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Domicile</th>
<th>Correct Information</th>
<th>Incorrect or No Information</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rural</td>
<td>204(67.8)</td>
<td>97(32.2)</td>
<td>301(100)</td>
<td>$P &gt; 0.05(x^2 = 0.741, df=1, p=0.691)$</td>
</tr>
<tr>
<td>2</td>
<td>Urban</td>
<td>114(70.4)</td>
<td>48(29.6)</td>
<td>162(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>318(68.7)</td>
<td>145(31.3)</td>
<td>463(100)</td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

In the present study, Health workers (27.9%) and Doctors (22.5%) were major source of information followed by family and friends (19.6%). Mass media like TV (14%) and news paper (9.7%) were not substantial in dissemination information on TB. This findings were similar to study by Malhotra et al in rural population of Delhi where source of information in more than half the respondents were doctor and health worker followed by mass media (33.7%). While Yadav et al in a study in Rajasthan reported that neighbors (50.5%), friends (42.6%) and family members (37.2%) followed by TV (28.7%) and Doctor (19.7%) are major source of information (14.2%). In a study by Tasnim S et al in urban setting in Bangladesh reported most common source of information was TV (46.8%) followed by Doctor (18.2%) and family member/friends. This shows it is necessary to integrate all available measures for dissemination of knowledge regarding tuberculosis to people.

In present study most common symptom reported was cough for more than 2 weeks, cough of any duration. Other symptom reported in present study were haemoptysis, loss of weight and fever. These findings are similar to findings in other studies. In a study by Malhotra et al in Delhi, symptom mentioned by majority of respondents were Cough with sputum (73.7%) followed by weakness/breathlessness (40.4%), fever (34.3%) and haemoptysis (30.3%). In a study by Yadav et al in Rajasthan commonest symptom mentioned by respondents were cough with expectoration for more than 3 weeks (45.2%) followed by haemoptysis (44.1%) and low grade fever (28.7%) in a study by Tasnim S et al in Bangladesh commonest symptom reported was night fever (89.8%) followed by fatigue/tiredness (86.5%), Productive cough (80.8%), cough for more than 3 weeks (61.6%). This indicates fairly good knowledge regarding Symptoms of tuberculosis. This will help in early case detection and passive case finding.

In the present study majority of respondents (69.5%) cited transmission of TB via air. Similar finding reported by Malhotra et al and Tasnim et al (65% and 56% respectively) In the present study respondents also mentioned Shake hand with TB pts, Sharing utensils, and contaminated water as mode of transmission of TB. Such misconceptions are also reported in previous studies.

In the present study majority of respondents knew
that TB can be cured with the help of doctor (90.3%) and treatment of TB is available free of cost from Govt. setup (67.4%). In a study by Tasnim S et al\(^5\) reported 97.5% respondents knew that TB can be cured by specific drugs given by health centre/DOTS. In a study by Malhotra et al\(^3\) depicts that 72.8 % of respondents reported that TB drugs are available free of cost.

In present study literacy status was significantly related to knowledge regarding various aspects of tuberculosis. Similar finding were reported in previous studies by , Malhotra et al\(^3\), Yadav et al\(^4\) and Purohit et al\(^6\).

Females, respondents with urban domicile and age group 18-25 yr are more aware regarding tuberculosis. But gender, urban domicile and age is not significantly related to knowledge regarding tuberculosis . Malhotra et al\(^3\) reported females and those without schooling were significantly less aware regarding various aspects of tuberculosis. Purohit et al \(^6\)reported respondents with Urban domicile and higher socioeconomic status has significantly better knowledge as compared to respondents with rural domicile and lower socioeconomic status.

CONCLUSION

Although study participants have fairly good knowledge regarding tuberculosis but misconceptions do prevail in community. Knowledge about tuberculosis is mainly determined by literacy status. Health education sessions and other sources of information including mass media should focus on poor and illiterate people to fill the knowledge gaps and bring a positive change to improve early detection of disease and patient compliance.

**Conflict of Interst- Nil**

**Source of Funding- Self**

**Ethical Clearance- Yes**

**REFERENCES**

2. RNTCP Annual status report 2017, Central TB division, CGHS, Ministry of health and family welfare, Govt. of India.
Role of Fine Needle Aspiration Cytology in the Diagnosis of Skin and Superficial Soft Tissue Lesions: A Study of 255 Cases

Ankit Singh¹, Amit Kumar Nirmal¹, Jay Kant Jha²

¹Post Graduate II⁴ year, Department of Pathology, Saraswathi Institute of Medical Sciences Hapur (U.P),
²Senior Resident, Department of Pathology, University College of Medical Sciences, Dilshad Garden, Delhi,
³Professor, Department of Pathology Saraswathi Institute of Medical Sciences Hapur (U.P)

ABSTRACT

Objective: Diseases of the skin and superficial subcutaneous soft tissues present with a wide array of lesions ranging from nonspecific dermatoses and inflammatory lesions to frank neoplasms. Though cytopathology is an excellent diagnostic tool in routine dermatologic practice, studies relating to histopathological and cytological correlation are sparse. The aim of this study was to analyze the concordance rate between cytological and histopathological diagnosis of skin and superficial soft tissue lesions.

Material and Method: We retrospectively studied 255 consecutive fine needle aspiration cytology findings of cases from October 2016 to June 2017 was carried out in the Department of Pathology, Saraswathi Institute of Medical Sciences and associated Hospital, Hapur, Uttar Pradesh, India and correlated their diagnoses based upon cytological and histopathological grounds.

Results: Out of the 255 cases studied, 126 were non neoplastic lesions and 129 were neoplastic. A high degree of concordance was observed (100% for malignant and 96.15% for benign lesions) when these two diagnostic modalities were compared. Histopathological correlation was possible in all malignant, 35/129 (27.13%) of benign and 19/126 (15.07%) of non-neoplastic lesions. Sensitivity and specificity of diagnoses were 95.31% and 97.6%, respectively.

Conclusion: It can be safely concluded that fine needle aspiration cytology is a rapid, reliable and fairly accurate tool for initial triage and treatment of skin and superficial soft tissue lesions.

Keywords: Skin, Soft tissue, Cytology, Fine needle aspiration cytology

INTRODUCTION

Various types of diseases are encountered in the skin and superficial soft tissues of the subcutis, ranging from nonspecific dermatoses and inflammatory processes to neoplastic conditions. Though cytopathology is an excellent diagnostic tool in routine dermatologic practice¹, studies relating to histopathological and cytological correlation are sparse. The common difficulties encountered in cytological diagnosis of primary soft tissue neoplasms are their overlapping cytomorphological features, heterogeneity in some of the mass lesions and the increased recognition of borderline (intermediate) lesions.²

MATERIALS AND METHOD

A total of 255 patients who underwent fine needle aspiration (FNA) for evaluation of various skin and superficial soft tissue lesions during the time period from October 2016 to June 2017 were included in Department of Pathology, Saraswathi Institute of Medical Sciences and associated Hospital, Hapur, Uttar Pradesh, India. A detailed history of the patients was taken and physical
examination findings were recorded.

FNA was performed for diagnosis in all cases. Skin scraping was done for superficial ulcers and ulcerated tumors. Tissue biopsy samples were obtained for 147 patients (28.82%). Excisional, incisional and punch biopsies were done for histopathological examination in 78.23%, 7.48% and 14.29% of the patients, respectively. Under aseptic precautions, fine needle aspirations were performed using a 21 gauge needle by palpation by pathologists. For most of the cases a single pass well sufficed. For larger lesions, 2 or 3 separate passes were made. Cytological smears were stained with Hematoxylin-Eosin (H&E) and Leishman-Giemsa for all cases. Ziehl-Neelsen (ZN) staining was performed for 10 cases. Histologic sections were routinely stained with the H&E stain. Concordance rates between cytological and histopathological diagnosis were analyzed.

RESULTS

Out of the 255 patients studied, 132 patients (51.76%) were male and 123 (48.23%) were female. The youngest patient was 2 years old, the oldest being 68 years (Table I). There were 126 non neoplastic lesions and 129 neoplastic. The majority of the neoplastic lesions were benign (99 cases (76.74%)) and only 30 (23.25%) cases were malignant. Epidermal inclusion cyst (EIC) was the most frequently encountered non neoplastic lesion (68 cases 53.96%). Other common lesions were acute suppurative lesions (32 cases 25.39%), ganglion (11 cases 8.73%) and granulomatous lesions (14 cases 11.11%). A single case of soft tissue filariasis was noted (Figure 1). Out of the 14 cases reported as granulomatous lesion, 10 showed acid fast bacilli in ZN smears. Among the benign neoplasms, lipoma was the predominant lesion (76.98%). Other common lesions were benign spindle cell neoplasms (15.07%) and vascular lesions (4.76%).

We found a few cases of neurofibroma, schwannoma and benign fibrous histiocytoma that where cytologically diagnosed as benign spindle cell lesion. We came across 3 cases of benign adnexal lesion among which one was diagnosed as pilomatrixoma (Figure 2). The other two could not be specifically typed but both were histologically diagnosed as pilomatrixoma. An erroneous diagnosis of EIC was given in 2 cases but later they were histologically confirmed to be pilomatrixoma (Table II). There were 68 malignant tumors with an age range of 2-65 years. Among the malignant tumors, squamous cell carcinoma was the most common (69.11%) followed by malignant spindle cell lesion (11.76%) (Table III). The youngest of our cases was a 2-year-old boy who presented with a swelling in the left upper eyelid and was diagnosed as embryonal rhabdomyosarcoma (Figure 3). Out of the 8 cases reported as malignant spindle cell lesions, 3 were provisionally diagnosed as MPNST out of which 2 were confirmed histopathologically and the other was finally diagnosed as monophasic synovial sarcoma (Figure 4). Among the other 5 cases, 3 were finally diagnosed as fibrosarcoma and 2 as angiosarcoma. Specific typing could therefore be done in just 25% of the cases for these type of lesions. One rare case of extraskeletal plasmacytoma was reported, developing in the scalp of a 6-year-old boy and is a very unusual site for this neoplasm. The smears from the 4 cases of malignant melanoma that presented as pigmented cutaneous nodular lesions demonstrated pleomorphic melanocytes having atypical hyperchromatic nuclei and intracytoplasmic melanin pigment. Sensitivity and specificity of the diagnoses were 95.31% and 97.6%, respectively. The concordance between cytological and histological diagnosis was noticed in all the malignant (100%) and 50/52 (96.15%) of benign lesions.

Table I : Distribution of patients by age and sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of cases</th>
<th>0-20yrs</th>
<th>21-40yrs</th>
<th>41-60yrs</th>
<th>&gt;60yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>132</td>
<td>24</td>
<td>40</td>
<td>50</td>
<td>18</td>
</tr>
<tr>
<td>Female</td>
<td>123</td>
<td>22</td>
<td>37</td>
<td>48</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>255</td>
<td>46</td>
<td>77</td>
<td>98</td>
<td>34</td>
</tr>
</tbody>
</table>
Figure 2: Smear from pilomatrixoma showing clusters of basaloid cells and scattered squamous cells on a background of calcification and amorphous material (Leishman-Giemsa; x40).

Table II: Distribution of benign neoplasms

<table>
<thead>
<tr>
<th>Type</th>
<th>No. of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipoma</td>
<td>97</td>
<td>77.98</td>
</tr>
<tr>
<td>Benign spindle cell neoplasms</td>
<td>19</td>
<td>15.07</td>
</tr>
<tr>
<td>Vascular lesions</td>
<td>6</td>
<td>4.76</td>
</tr>
<tr>
<td>Benign adnexal lesions</td>
<td>1</td>
<td>0.79</td>
</tr>
<tr>
<td>Nodular fasciitis</td>
<td>2</td>
<td>1.58</td>
</tr>
<tr>
<td>Chondroid syringoma</td>
<td>1</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>126</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table III: Distribution of malignant neoplasms

<table>
<thead>
<tr>
<th>Type</th>
<th>No. of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Squamous cell carcinoma</td>
<td>10</td>
<td>33.33</td>
</tr>
<tr>
<td>Malignant spindle cell lesion</td>
<td>7</td>
<td>23.33</td>
</tr>
<tr>
<td>Metastatic ductal carcinoma of breast</td>
<td>5</td>
<td>16.66</td>
</tr>
<tr>
<td>Malignant melanoma</td>
<td>4</td>
<td>13.33</td>
</tr>
<tr>
<td>Embryonal rhabdomyosarcoma</td>
<td>2</td>
<td>6.66</td>
</tr>
<tr>
<td>Meibomian carcinoma</td>
<td>1</td>
<td>3.33</td>
</tr>
<tr>
<td>Extraskeletal plasmacytoma</td>
<td>1</td>
<td>3.33</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td></td>
</tr>
</tbody>
</table>
**DISCUSSION**

In the current era where ‘the needle is preceding the scalpel’ as surgical tissue biopsy becomes increasingly expensive, it seems practical to discuss the role and scope of FNAC in diagnosing skin and soft tissue tumors.\(^3\) It was seen that biopsy provided complete tissue details for accurate diagnosis; however, diagnosis takes a longer time as compared to the early diagnosis provided by cytology. Yet it may not be readily available, as is evident from this study, where 137 cases reported as benign neoplasm in the cytopathological report did not comply with a request for biopsy. The concordance between cytological and histological diagnosis was noticed in all the malignant (100%) and 96.15% of benign lesions. Thus, a considerably high degree of concordance was achieved among cytological and histological modalities of diagnosis. Only two cases of pilomatrixoma were misdiagnosed as epidermal inclusion cysts. The main reasons behind the erroneous diagnosis was the selective sampling of squamous cells. These findings are in concordance with a previous study by Bansal et al.\(^4\)

Lipoma was the predominant benign tumor (81.34%) in our study, keeping in concordance with the study by Beg et al.\(^5\) The most frequent malignant neoplasm encountered in our study was squamous cell carcinoma which is at par with the published literature.\(^6\) Eight cases were reported as malignant spindle cell lesion cytologically. Among them 3 were provisionally diagnosed as MPNST out of which 2 were confirmed histopathologically and the other was finally diagnosed as monophasic synovial sarcoma. It may often be difficult to differentiate MPNST from monophasic synovial sarcoma (particularly the fibrous variant) only on morphological grounds without recourse to immunohistochemical or cytogenetic studies, which was also observed by Folpe et al.\(^7,8\)

A histological diagnosis of fibrosarcoma was made in 3 cases and angiosarcoma in 2 cases. Thus, specific typing could be done in just 25% of the cases of these malignant spindle cell lesions. Exact cytological typing for these types of lesions were possible in 23.33% cases in a study by Rekhi et al.\(^3\) The aspirate from the 2 cases of embryonal rhabdomyosarcoma showed moderately pleomorphic small and large cells admixed with typical rhabdomyoblast like cells. Histological confirmation was obtained. Interestingly, we also encountered a single case of extraskeletal plasmacytoma at an unusual site that revealed diffuse population of plasmacytoid cells. The smears from the 4 cases of malignant melanoma that presented as pigmented cutaneous nodular lesions did not pose any diagnostic difficulties. Five of our cases had a past history of ductal carcinoma of the breast and they presented with metastatic nodular deposits in the overlying skin that was evident cytologically. FNAC proved to be of great value in the investigation of clinically suspected metastatic lesions, keeping at par with the studies undertaken by Wong et al., Rekhi et al. and Spitz et al.\(^3,9,10\)

In conclusion, FNAC is a rapid, reliable and fairly accurate tool for initial triage and treatment of skin and superficial soft tissue lesions. However, it should be correlated with the clinical history, and histopathological...
and immunohistochemical studies wherever necessary for the final diagnosis and management.

Source of Funding - None

Ethical Permission - Taken from ethical committee of Institute

Conflict of Interest - None

REFERENCES


A Conceptual Study on How Electronic Recruitment Tools Simplify the Hiring Process

Ramkumar A
Assistant Professor & Research Scholar, School of Management Studies, Department of Business Administration, Vels University, Pallavaram, Chennai

ABSTRACT

Recruitment is a basic need of every developing and progressive organization. But, recruiting new employees can be challenging, expensive and painful! For a hiring manager, recruiting skilled candidates to fill key positions and retaining top talent is a tedious task. Besides this, recruiters are often seen facing problems, like lack of available applicants and lack of industry-specific competencies in the prospective candidates. HR leaders are always busy managing multiple human resource functions and maintaining harmonious environment in the organization. An environment where employees are motivated to give their best performance and contribute to organizational success. An online applicant tracking tool initiates a recruitment process by sorting huge volumes of resumes to find out only the best ones that fit well for the vacant positions.

Keywords: Applicants, Communication, Environment, Information, Job, Organisation, Performance, Online-Recruitment, Selection, Skill, Technology, Tools.

INTRODUCTION

Recruitment is a basic need of every emerging and enlightened organization. But, recruiting new employees can be challenging, expensive and hurting! For a hiring manager, recruiting skilled candidates to fill key positions and retaining top talent is a tedious task. Besides this, recruiters are often seen facing problems, like lack of available applicants and lack of industry-specific competencies in the prospective candidates. As a result, they are unable to establish an ideal talent pool.

With the development of HR technology, the impacts of these recruitment challenges have reduced greatly in past two decades.

Recruitment tools, which were once available to few recruiting agencies at higher prices, are now accessible to anyone around the globe. Cloud HR technology has made life of HR people easier by streamlining recruitment processes in simpler way.

LITERATURE REVIEW

According to Fuertmueller (2012), e-recruitment is a diverse topic fed by various disciplines including Human Resources Management, Organizational Behaviour, Management, Information Technology and Computer Science fields. Because of this diversity, a comprehensive search for relevant journal articles in human resource management and information systems was required.

In recent years, there has been a large number of publications on e-recruitment and the increasing diversity of publications on e-recruiting research calls for a synthesis (Wolswinkel et al., 2010). The notion of an online recruitment system is derived from literature surrounding the basis of e-HRM and functions of a web-based channel for e-recruitment. This review integrates the various e-recruitment findings and the possibility of developing a functional system that runs online recruitment.

SIGNIFICANCE OF ONLINE RECRUITMENT TOOLS

HR leaders are always busy managing multiple human resource functions and maintaining harmonious environment in the organization. An environment where employees are motivated to give their best performance
and contribute to organizational success. In order to achieve the feat, HR managers use best online HR tools that help them to adhere HR rules and policies in the right manner.\textsuperscript{4}

Reliable recruiting tools support end-to-end hiring cycle to find great employees and ethically hire them. Using automated tools not only helps in making the recruitment process effective, but it also shortens the time taken to complete candidate sourcing, applicant tracking, and selection and onboarding.

**OBJECTIVES OF THE STUDY**

To analyse how electronic recruitment tools simplify the online recruitment process.

To study about the e-recruitment process and systems.

Gives the guideline for recruiting the right people for the right job with less cost and time

Determine which recruitment and selection practices are more effective.

**HOW CLOUD-BASED RECRUITMENT SOFTWARE WORKS?**

An online recruitment tool allows hiring managers to publish job posts for internal and external candidates and receive large volume of resumes from multiple candidates.\textsuperscript{4} Easy integration of recruitment tool with company website makes it easier for recruiters to publish job vacancies.\textsuperscript{5} It also allows internal candidates to view & apply via employee portal while external candidates respond to vacancies through job portal page. Recruiters schedule interviews of shortlisted candidates by assigning test coordinators and interviewers. They easily evaluate interview results and send offer letters to the hired candidates.\textsuperscript{3}

**WORKFLOW OF CLOUD-BASED RECRUITMENT TOOLS**

With a professional recruiting tool, hiring managers can perform –

**Applicant tracking and selection**

An online applicant tracking tool initiates a recruitment process by sorting huge volumes of resumes to find out only the best ones that fit well for the vacant positions.\textsuperscript{5} An automated ATS makes use of specific set of keywords to find out relevant applications. Take a quick look at the detailed workflow of an online applicant tracking tool:

i. Creating Job Requirement: To begin with the process, the manager/recruiting manager creates a job requirement to fill a vacant position in a team.\textsuperscript{6} If a manager takes the initiative to create job requirement, he/she needs to take approval by recruiting manager on the same.\textsuperscript{4}

ii. Publishing Job Requirement: To get applicants from internal and external candidates, the recruiting manager publishes the job requirement.\textsuperscript{3}

iii. Shortlisting: HR manager receives multiple resumes from the vacant position. Amongst the available applications, recruiting manager needs to shortlist candidates whose skill set and capabilities match with the pre-defined job description.\textsuperscript{5}

Using recruitment database, HR manager can also review resumes that have been submitted by candidates in the past to shortlist right candidates.

iv. Assign Tests & Conduct Interviews: For the selection of talented professionals, it is necessary to conduct interviews and tests to decide on their capabilities and skills. An automated tool helps in assigning multiple test coordinators and interviewers to interview different candidates at the same time.\textsuperscript{6}

v. Interviewer Submits Feedback and Scores: When there are too many candidates that apply for a same position, it becomes difficult to compare their skills and hire the right person.\textsuperscript{3} But in presence of automated ATS, interviewers can give scores or ratings to the applicants and instantly share their feedback.\textsuperscript{7}

vi. Selection: After comparing the scores of all candidates, recruiting manager takes final decision on selection of some candidates. He/ She also perform background verification of the selected candidates before giving out job offers.\textsuperscript{6}

vii. Job Offer: On the basis of reference checks, the recruiting manager takes a final call for the finalized candidates and sends them the offer letters.\textsuperscript{1}

**Onboarding**

Employees’ onboarding tools are helpful in preparing
new employees for their new job role and responsibilities. Most of the organizations plan onboarding for their new hires to make them feel welcomed, comfortable and valued. It leads improved employee performance, engagement and retention.³

When employees realize that they are valued, they are inclined to move an extra mile to achieve their organizational objectives and add more value to company profits.⁵

1. Configure Onboarding Form: An online employee onboarding tools allow HR to configure onboarding forms depending upon the company process.²

2. Initiate Onboarding Process: The HR manager initiates onboarding process by providing a URL to the new hire where he/she can add personal and professional details.³

3. Add Employee Information to Database: On submission of the onboarding form by employee, HR manager completes other job related details and submits this form to HRIS database.⁷

4. Generate Employee Code: On completion of this step, employee code is generated and given to the new employee.²

**E-RECRUITMENT PROCESS OF EMPLOYEES: JOB PORTALS AND ONLINE RECRUITMENT TECHNIQUES**

E-Recruitment Process of Employees: Job Portals and Resume Scanners!

The buzzword and the latest trends in recruitment is the “E-Recruitment”. Also known as “Online recruitment”, it is the use of technology or the web based tools to assist the recruitment process. The tool can be either a job website like naukri.com, the organization’s corporate website or its own intranet. Many big and small organizations are using Internet as a source of recruitment.²

They advertise job vacancies through worldwide web. The job seekers send their applications or curriculum vitae (CV) through an e-mail using the Internet. Alternatively job seekers place their CV’s in worldwide web, which can be drawn by prospective employees depending upon their requirements.³

**Recruitment Process**

Definition: The Recruitment is the process of analysing the job requirements and then finding the prospective candidates who are then encouraged and stimulated to apply for the job in the organization.⁴

The Recruitment programme is designed to attract more and more applicants such that the pool of candidates applies for the job, and the organization has more options to select the best out of them. The recruitment process consists of five interrelated stages which are as follows:

1. Recruitment Planning: The recruitment process begins with the planning where in the vacant job positions are analyzed and then the comprehensive job draft is prepared that includes: job specifications and its nature, skills, qualifications, experience needed for the job, etc.

   Here, the recruitment committee decides on the number and the type of applicants to be contacted. The aim of any organization is to attract more candidates as some of them might not be willing to join, or some might not qualify for the job position. So the company has a sufficient number of candidates to choose amongst them.³ The type of candidates required for the job is well specified in terms of the task and responsibilities involved in a job along with the qualification and experience expected.⁶

2. Strategy Development: Once the comprehensive job draft is prepared, and the type and the number of recruits required are decided upon; the next step is to decide a strategy that is adopted while recruiting the prospective candidates in the organization. The following strategic considerations should be kept in mind⁶

   - Make or Buy Employees, which means the firm either, decides to select less skilled employees and invest
in training and education programmes or hire skilled professionals.2

- Methods of Recruitment, the firm decide on the methods used for recruiting the individuals. Such as the internet provides detailed information about the prospective candidates and helps in shortlisting the best-qualified individuals.5

- Geographical Area, the next decision is related to the area from where the candidates shall be searched. The firm looks for those areas where the handful amount of qualified employees is concentrated, with a view to curtailing a search cost.6

- Sources of Recruitment, there are two sources of recruitment: Internal source (within the organization), external source (outside the organization). The firm must decide the source from where the candidates are hired.1

3. Searching: Once the strategy is prepared the search for the candidates can be initialized. It includes two steps: source activation and selling. The source activation means, the search for the candidate activates on the employee requisition i.e. until and unless the line manager verifies that the vacancy exists, the search process cannot be initiated.7

The next point to be considered is selling, which means the firm must judiciously select that media of communication that successfully conveys the employment information to the prospective candidates.3

4. Screening: The screening means to shortlist the applications of the candidates for further selection process. Although, the screening is considered as the starting point of selection but is integral to the recruitment process.3 this is because the selection process begins only after the applications are scrutinized and shortlisted on the basis of job requirements. The purpose of recruitment here is to remove those applications at an early stage which clearly seems to be unqualified for the job.6

5. Evaluation and Control: Evaluation and control is the last stage in the recruitment process wherein the validity and effectiveness of the process and the methods used therein is assessed7. This stage is crucial because the firm has to check the output in terms of the cost incurred.

CONCLUSION

Using automated tools not only helps in making the recruitment process effective, but it also shortens the time taken to complete candidate sourcing, applicant tracking, and selection and on boarding. The recruitment is a costly process as it includes the salaries of recruiters, time spent by the management, cost of advertisement, cost of selection, a price paid for the overtime and outsourcing in case the vacancy remains unfilled. Thus, a firm is required to gather all these relevant information to evaluate the performance of a recruitment process effectively.2

Ethical Clearance: Nil

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


Study of Compliance of Surgical & Medical ICUs to the Process of Preventing Needle Stick Injuries & Blood/Body Fluid Exposures

A P Pandit¹, Bhairavee Samant², Vidhi Jain³

¹Professor, ²Student, ³Student, Symbiosis Institute of Health Sciences, S B Road, Pune

ABSTRACT

Healthcare workers are at a risk of infection with blood borne infections during the course of their work. Over 90% of these infections occur in low-income countries and most are preventable.¹ The focus of the study was to find out the compliance of the ICU staff to a process designed to prevent needle stick in Surgical & Medical ICUs of a tertiary care hospital. Cross-sectional primary data was collected using a process bundle (checklist) to study 100 samples from Surgical (50 samples) and Medical (50 samples) ICUs in June 2014. After the analysis it was found that overall compliance to the process was better in Medical ICU than in Surgical ICU and reasons for non-compliance were related to un-awareness and ignorance of the staff.

Key-words: Needle-stick Injury, Blood/Body fluid exposures, Personal Protective Equipment (PPE)

INTRODUCTION

Intensive Care Units are the hospital settings where maximum interactions are expected between the staff and the patients. These interactions apart from helping in the care and recovery of the patients also put certain risks on the medical and paramedical staff by causing needle stick injuries and blood/body fluid exposure. Hence, it is considered as a quality indicator according to NABH quality standards.²

The study is a primary study done in Surgical & Medical Intensive Care Units of a tertiary care hospital by using a newly designed process bundle to evaluate the compliance of the staff to the processes required to be followed to prevent needle stick injury or blood/body fluid exposure during a bedside clinical procedure. A bundle is a group of interventions related to a process that, when executed together, result in better outcomes than when implemented individually. The study aims at comparing the performance of surgical and medical ICUs & finding out the reasons for non-compliance.

METHODOLOGY

Study design: It was a cross-sectional study and each sample was studied only once.

Study setting: Study was conducted to compare the compliance of surgical and medical ICUs of a tertiary care hospital in Mumbai.

Study instrument: A process bundle in the form of a checklist was designed to check compliance at each step of the clinical interaction. The checklist was filled using observations, documentations and by interviewing staff and patients.

Sample size: The population studied consisted of inpatients admitted in ICUs in the month of June 2014. The sample size was more than 20% of the total population.

Total 100 samples were studied which consisted of 50 samples from Surgical ICU and 50 samples from Medical ICU.

The checklist was used to evaluate the performance of surgical and medical ICUs.
**Inclusion criteria:** The inpatients were studied while a bed-side clinical procedure was being performed. The compliance was checked for the consultants, resident doctors, medical officers, nursing staff and housekeeping staff.

**Data analysis**

Data analysis was done using Microsoft Excel.

**RESULTS**

Comparison of overall compliance between the Surgical & Medical ICUs

![Fig 1: Comparison of Compliance between the ICUs](image)

**Fig 1:** Comparison of Compliance between the ICUs

Significant factors amounting to non-compliance

1. Staff not practicing proper needle re-capping technique. The staff was expected to use the no-touch technique of recapping which was not being followed. (31% in SICU & 27% MICU)

2. Staff was not using proper Personal Protective Equipment (PPE) intended to be used for the particular clinical processes. This was either due to ignorance or due the staff being in hurry. (24% in SICU & 14% in MICU)

3. Ideally staff should carry the sharps in a tray while travelling from one place to another even within the ICU setting. It was found that the staff was not carrying needles in proper way, some of them were seen roaming around the ICU with needle syringes in their hand (23% in MICU and 17% in SICU)


**DISCUSSION**

There is a need for standardized procedures and tested interventions to be widely distributed to healthcare workers all over the globe. This process bundle is designed to provide an approved course of action to be taken by all persons who are exposed to blood or body fluids either through needle-stick injury or other means. This process bundle aims to reduce needlestick, other sharps injuries and exposure to all persons within corrective services facilities. This policy and associated procedure sets out the standards for minimizing the risk of transmission of blood borne viral infections (i.e. hepatitis B, C and HIV) following staff accidental body fluid exposure. WHO reports in the World Health Report 2002, that of the 35 million health-care workers, 2 million experience percutaneous exposure to infectious diseases each year.

**RECOMMENDATIONS**

Proper training should be given to the staff who are at risk as well as those who are not directly involved but can keep a check on the processes followed by at-risk population.

Regular rounds should be taken by housekeeping staff to remove sharps or soiled material lying in the cubicle.

A simple poster which will act as a reminder to wear PPE (personal protective equipment) for each procedure should be present in each cubicle which will also serve as a mental checklist for the staff.

**CONCLUSION**

For continuous quality improvement, hospitals must aim at minimizing the incidences of Needle stick Injuries & Blood/Body fluid exposures to zero level. To achieve this target, Hospitals must train the healthcare workers to follow the bundle, improve the work settings to eliminate errors, revise the bundle periodically to make it stricter & encourage error reporting.

The study has not been funded by any agency.
There is no conflict of interest.

The study has been done as a part of Summer Internship Program of MBA (HHM) students, so there was no clinical intervention & hence does not require Ethical Committee clearance.

REFERENCES

E-Recruitment through Job Portals and Social Media Network: Challenges & Opportunities

Ramkumar A
Assistant Professor & Research Scholar, School of Management Studies, Department of Business Administration, Vels University, Pallavaram, Chennai

ABSTRACT

The rapid development of modern Information and Communications Technology (ICT) has resulted in an increasing number of job-seekers turning to the Web for information. This has motivated the use of electronic recruitment (e-recruitment) systems, also known as online recruitment which is one of the emerging worldwide trends in electronic human resource management (E-HRM) functions. E-HRM is a way of implementing HRM strategies, policies and practices in an organization through a directed support of Web technology based channels. The Internet can facilitate the selection of employees and other HR functions related to recruitment, especially where long distances are involved. This has dramatically changed the way business is conducted and this use of technology is clearly demonstrated by the number of organizations and individuals who utilize the Internet and electronic media. In terms of HR management, the Internet has changed the recruitment perspective for both organizations and job seekers. This paper helps to identify the merits and demerits of HR Portals and Social Media Network for recruiting the suitable candidates and the challenges faced by it.

Keywords: Information and Communications Technology, e-recruitment systems, online recruitment, human resources, Internet, E-HRM, electronic media, HR portals, Social Media Network.

INTRODUCTION

Recruitment includes practices and activities carried out by an organization with the primary purpose of identifying and attracting potential employees. With the development of new technology, recruitment has shifted from traditional methods to evolving online methods. The first decade of the twenty-first century saw rapid growth in the use of online recruitment and the transformation of electronic recruitment into one of the fastest growing recruitment techniques (Holm, 2010). Online recruitment systems provide an avenue for centralized storage, management and distribution of recruitment information. Given the physical geography of Papua New Guinea (PNG) such a system should prove very attractive. This will not only target the ever increasing human resource talent, but also introduce an accountability mechanism for tracking and transparency purposes. This is further emphasized in PNG’s Vision 2050, which asserts that “We will be a smart, wise, fair and happy society by 2050” (National Strategic Plan Taskforce, 2009).

OBJECTIVES OF THE STUDY

1. To understand the trends and practices of e-Recruitment in the recruitment process of a company

2. To compare the traditional recruitment process with e-Recruitment and also discuss the advantages and disadvantages of e-Recruitment

3. To analyse the potential of e-Recruitment and the challenges faced by it.

4. To analyse the recent trends of Recruitment practices

5. To analyse the merits and demerits of using the HR portals and Social Media Network for recruiting the suitable candidates.
Trends in e-recruitment:

There is growing evidence that organisations are using Internet technology and the World Wide Web as a platform for recruiting and testing candidates. The IES survey of 50 organisations using E-recruitment reported that the primary drivers behind the decisions to pursue e-recruitment were to:

- improve corporate image and profile
- reduce recruitment costs
- reduce administrative burden
- Employ better tools for the recruitment team.

The trends in e-recruitment use suggest a changing landscape whereby in future the candidate is connected to the central system and there is involvement of the line manager in the process (see figure). In addition to the reported benefits such as cost efficiencies, the role of HR in this model is viewed as more of a facilitative role, in theory allowing time for recruiters to become involved in the strategic issues within resourcing.

E-RECRUITMENT CHALLENGES:

From the employer viewpoint:

- The best candidates for a job are likely already employed by your competitors. But identifying these candidates is a hard problem, convincing them to come and work for you is harder still.
- The hiring pipeline (screening, interviewing, etc.) is often fairly unreliable at separating the good candidates from the bad.
- References are almost worthless now, as people have stopped giving bad references.
- Mismatch between hiring schedule of employers and candidates means that often when good candidates are available, job vacancies aren’t.

From a candidate viewpoint:

- Most candidates are weak negotiators only negotiating their salary a handful of times in their lifetime. The company likely negotiates salaries on a daily basis, hence negotiations tend to favour the more experienced employer.
- Finding a company you want to work for is hard
- Opaqueness of the hiring process is often frustrating (candidates often left “hanging” rather than rejected outright)
- It’s hard to tell what a company’s culture is like internally before you work there.
- Salaries are blinded; often companies give no indication of the salary of a role.

SOCIAL MEDIA NETWORK

Everybody is aware of the fact that social media is the biggest advancement in the world of recruitment. The social media has made it possible to use technology for tasks such as attracting, finding and assessing candidates. Companies are using social media websites such as LinkedIn, Facebook and Twitter not only to identify talent but also to attract talent through targeted social media campaigns and to find the right candidate for their organization. Recruitment through social media is considered to be more efficient and effective as well as low on cost.

LinkedIn has played a vital role in the way recruiter communicates and attracts potential candidates. Earlier it was a game where candidates used to fight for attention of recruiter but the scenario has completely changed. Recruiters are chasing, engaging and socialising with the potential candidates through social media.

Recruiters are actively building a social network.

- Now let’s have a look at the evolution of Social Recruitment.
- 1995 Internet Forums
- 2002 LinkedIn, A professional networking website
2004 Facebook, an online social networking website

2006 Twitter, social networking and micro blogging website

2008 Jobvite, social recruitment tool and micro blogging services

2010 Branchout, a Facebook application for networking, recruiting and finding jobs

Social media helps in connecting with the candidates and has taken the interaction with candidates to a different level altogether. Social networking sites allow the recruiter to be on the same platform as of the candidate’s. More the number of connections in the network the more recruiter will grow. People will start trusting and once the candidate gets impressed, recruiter will gain ten more potential candidates.

**PROS OF SOCIAL RECRUITMENT**

- The vacancies can be filled quickly
- Social recruitment is low cost affair and provides good ROI.
- It’s a great way of attracting fresh talent for entry level positions.
- Employer branding
- Open positions can be read and seen by a large number of potential candidates.

**CONS OF SOCIAL RECRUITMENT**

- Due to heavy traffic on these websites, job posts have a shorter life. Because of privacy settings it becomes difficult to communicate with the candidates.
- Candidates may not be genuine.
- LinkedIn has a limited number of Inmail messages.
- Social media is a source of influence, a great power in our industry. It’s a simple fact that recruiters who are using social media can do better.

Through social recruitment recruiters are working towards a future that will show a clear emphasis on workflow and measurable results. Instead of long tiring interviews one can sit on social networking sites, build new and develop old professional relationships.

1. Determine Your Objectives: Determine and define your objectives for using social media for recruiting and align them to your business objectives

2. Identify Your Audience: It is important to understand the audience one is trying to reach and the following questions help in identifying the target audience:

   - Where are they present on the web?
   - How do they use social media?
   - What is the supply and demand?

3. Select a Social Media Platform: Select the right social media platforms that will meet your objectives and find the right audience

4. Build your Team: Choose the people who are best suited and motivated to take responsibility for social media

5. Training: Provide your team with all the training required to be effective and responsive

6. Create Content to Post: You need to create content to post and share on your social networks in order to attract candidates.

7. Measure Results: You need to ensure measurement is in place to assess success of objectives. It can be done through surveys or feedback from clients and candidates about the hiring process using social media as well as through HR metrics like source yield ratio.

8. Evaluate: Every step of the process needs to be evaluated to ensure that it remains effective and efficient.

**CERTAIN ASPECTS OF USING SOCIAL MEDIA FOR RECRUITMENT PROCESS**

So, we know that how a company uses the social media to find candidates and how it stimulates them to apply for the job. The way of using social media in recruitment has also been discussed. Now, some of the aspects of using social media have been discussed below:-
BENEFITS

1. Specific candidates can be searched geographically with higher accuracy than ever before, thereby narrowing the number of candidates and increasing recruitment effectiveness consequently.7

2. Due to social media’s quick response time and high usage rate, accessible jobs are filled quickly by reducing vacancy rates.1

3. Social media recruitment has a low cost and higher ROI (as seen in most of the cases).

4. A big number of social media users are college students or youth, thus establishing a great platform for potential companies to attract new talent for entry level positions.

5. Access to the cream level of available candidates is faster, thus helping a company’s ability to attract talent versus competitors.5

6. It also contributes in raising the employer’s brand image online and creates a leading-edge icon for the brand.2

7. Vacant or open positions can be seen and read by a larger number of competent candidates, thus making the job hiring or recruitment process a wonderful experience.2

8. With the help of social media, employers can reach candidates quickly and at a lower cost because, as compared to agencies, job boards or referrals, recruiting with social media is absolutely free.3

9. Social media will extend the information about a company making more and more people alert about its job opportunities and getting employers in front of candidates whom they may never find while using traditional hiring methods.5

10. With social media platforms like LinkedIn, job seekers can be specifically targeted and chosen from followers, connections or supporters of the brand.3

PROBLEMS:

1. The first problem that many companies face is deciding their social media usage policy. Moreover, implementing the policy sometimes results in high investments.

2. The focus needs to be on answering not only what your company and its brand is stating, but also to whom.2

3. The usage is still in its infancy and return on investment is not yet really identified.

4. One of the problems occurred with social media (as it connects to recruiting) is rooted in the overall efficiency of the tools available to both potential candidates and the overall efficiency of the tools available to company’s recruiting team. Most of the times, one side is efficient while the other side is not, thus leading to the gap.5

5. From a risk point of view, due to the fact that all current, former and future employees of a company are already online, it becomes a big challenge to manage them.

6. Managing the comments or views about the company is very complicated. No matter how hard you try negative content will leak through the net.7 Moreover, if that negative content is not taken care of as early as possible, then it might ruin the brand image completely.

7. The online information is not trustworthy and there is no guarantee of it being accurate. Also not all the requisite demographics will be available. Eventually it is the candidate who decides what you can see or access.6

8. Discrimination is another downside. Knowing the private or personal facts of the potential employees, it can influence the decision of the employer. Some of the factors that might manipulate an employer are race, traditions, religious views, age and sometimes even the social status.2

9. Lots of efforts are required to attract the people towards the advertisements displayed through Social media providing the information about the company. This may require engaging experts for making the company’s advertisements attractive. This directly adds to the cost of using social media.3

10. The information displayed on SNWs should be up to date. Otherwise, it might ruin the image of the company and consequently, it will lose its followers or regular visitors.

11. Lastly, social media can be misused if any competitor makes the fake profile of the company on SNWs with a direct intention to spoil the public image of that company.2
PROS AND CONS OF JOR PORTALS:

Merits:

1. Easy to find the best candidates
2. Mobilising the best talent people.
3. Less time consuming
4. Data maintenance is simple and easy.
5. Quicker recruitment process and simple system procedures.
6. 24*7 hours is possible.

Demerits:

Low Privacy and the security related information available in the portal.

Job seekers sometimes not able to understand the procedure.

Confusions in the Job Seekers and HR recruiters about the HR policy.

PLAYERS IN THE RECRUITMENT MARKET:

1. Job Seeker: The job seeker is the person who desires for a job. There are two kinds of job seekers which are

   a) Active Job Seekers: The candidates who frequently search for a job because of one reason other, viz; better opportunity for growth, personal reasons to change and professional reasons etc. Commercial job boards/portals have truly complimented with their needs.

   b) Passive Job Seekers: Passive candidates are those workers who are not currently planning to change their jobs but still they regularly surf the internet for any one of million reasons during their normal routine. Such candidates may come across new job opportunities and simply drop their resumes on internet. Corporate websites is the most preferred destination for passive job seekers.

2. Recruitment Market: The recruitment market can be explained in three ways i.e. the traditional way which constitutes all the traditional methods of recruiting the candidates through newspaper ads, head hunters and temporary recruitment agencies etc. The second way is the new look of the traditional way which include

   old wine in new bottle like online newspapers ads, online head-hunters and online temporary recruitment agencies.

   The third and the most used way in the current scenario is the e-way. It holds purely online methods of recruiting talent, viz; commercial job boards/portals, corporate websites and e-mails

3. Potential Employers (Firms/Companies): The final destination of the every job seeker is to reach the potential employer. It means the companies/ firms who employ them on the basis of their capabilities and job requirements.

Modern Trends of E-Recruitment:

- Speedy communication: Company and the prospective employee can communicate with each other via the blogs. Thus blogs, podcasts, vodcasts are being considered a tool of e-recruitment. No more the process can be blamed for being one way communication like mails, faxes only being speedy as done electronically. Podcasts are the services of digital media files. Vodcasts are the video podcasts.

- Candidate’s preference: History states that employers had the privilege to be selective in hiring process, especially in screening resumes but were not always fair. Because of the time constraint it was not possible to go through all the applications. Today the candidates can choose their employers as not only the financial state is known to them but also the culture is known. Applying for the Organization will no more be influenced only by the image?

- Search engine advertisement: Print ad is phasing out due the popularity of search engine ads. Pay-per-click is not only convenient but also more attractive.

- RSS feed: Job boards are embracing RSS feed. Hot jobs, Google deserves special mention. Google offers one to upload the jobs on Google Base even when one doesn’t have their own site. RSS can be read using software “RSS reader”. It is a family of web feed formats use to publish frequently updated works. Such as blog entries, news headlines in a standard format.

CONCLUSION

It is about the recruitment system being able to attract the right candidate, the selection process being based on sound and credible criteria, and the tracking process being able to integrate with existing systems.
perhaps most significantly, e-recruitment is about cultural and behavioural change, both within HR and at line management level. From our evidence, we suggest that for e-recruitment to deliver, it is about developing the capability of HR to facilitate the system and to view the staffing process as an end-to-end process, similar to that of a supply chain.

**Ethical Clearance:** Nil

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**


The Study on Thyroid Status among Newborns in Gautam Budha Nagar District in India

Chandra Prakash Sharma1, Widhi Dubey2, Suryakant Nagtilak3

1Research Scholar, 2Director, School of Sciences, JECRC University, Ramchandrapura, Sitapura, Jaipur (Rajasthan), 3Prof. & Head, Dept. of Biochemistry, Sridev Suman Subharti Medical College, Dehradun (Uttrakhand)

ABSTRACT

Introduction:- Iodine is an essential micro nutrient for the production of thyroid hormones triiodothyronine (T3) and thyroxine (T4). Micronutrient deficiencies, more commonly referred to as “hidden hunger”, form a significant component of burden of malnutrition worldwide, so more in developing countries like India. Deficiencies of iodine, iron, folic acid, vitamin A and zinc are the leading five causes of micronutrient deficiencies which constitute a global public health problem. A pregnant woman needs more iodine for normal metabolism as well as for the requirements of T4 and iodide transfer to the fetus.

Objectives:- To study the serum Thyroid Stimulating Hormone (TSH) in neonates and assess the sex differences in thyroid function.

Results:- The mean serum levels of TSH were higher in females and the significant differences were observed in serum TSH between males and females neonates of the study area.

Conclusion:- The present study underlines the importance of newborn screening for thyroid dysfunction. The high reported prevalence of congenital Hypothyroidism (CH) in our country due to the lack of international standardization. To actual manifestation of CH in India need to screen more population, helps in making a more precise evaluation of thyroid status in neonates. Most of the laboratories monitoring in infancy is essential to ensure optimal neurocognitive outcome. Serum TSH and free T4 should be measured every 1-2 months in the first 6 months of life and every 3-4 months thereafter. In general, the prognoses of newborns detected CH by screening and get the treatment as early as possible.

Keywords:- Thyroid stimulating hormone (TSH), congenital hypothyroidism (CH), newborns, screening, Iodine deficiency.

INTRODUCTION

Iodine is an essential micro nutrient for the production of thyroid hormones triiodothyronine (T3) and thyroxine (T4). The Micronutrient deficiencies are more commonly referred to as “hidden hunger”, form a significant component of burden of malnutrition worldwide, so more in developing countries like India. Deficiencies of iodine, iron, folic acid, vitamin A and zinc are the leading five causes of micronutrient deficiencies which constitute a global public health problem [1]. A pregnant woman required more iodine for normal metabolism as well as for the requirements of T4 and iodide transfer to the fetus. An insufficient supply of thyroid hormones to the developing brain of the fetus can result in congenital anomalies and intellectual damage [2]. In the early stage of life the signs and symptoms of congenital hypothyroidism (CH) are often non-specific unless it is tested biochemically, and CH will be intermittently overlooked, resulting in unrecoverable neurological damage caused by thyroid
hormone deficiency during this imperative period of brain development. Screening programs for neonatal thyroid function were introduced in many countries in the early 1970s. On the initial screening method was measurement of T4 by heel-prick blood spots sample. This has been superseded by measurement of thyroid stimulating hormone (TSH) level in most programmes around the world including in India. The major issue was that it is unable to detect central (hypothalamic or pituitary) hypothyroidism, a rare disorder occurring in approximately 1 in 20,000 neonates, which can be picked up only by doing T4 test. Serum TSH assay can detect the subclinical or transient primary hypothyroidism that can be missed by T4 assay in screening programs for CH.

The first multi-centric study for screening above more than 1 lakhs neonates born throughout India was launched by Indian Council of Medical Research (ICMR) National Task Force Team on New Born Screening (NBS) at AIIMS New Delhi (2007–2012) and the preliminary results reveal a much higher incidence of CH all over India at 1 in 1172, particularly in south Indian population (1 in 727). Results have been released by ICMR team on March 15, 2013 presided by Tamil Nadu Government Deputy Director of Medical Education. Only few studies have been published on the thyroid status of the newborns in India to assessing the neonatal TSH level. Further, after the implementation of the universal salt iodization program in India there have not been any published data on thyroid status among the neonates. Iodine supplementation during pregnancy is not a routine practice in India. The Policy makers might be think that the salt iodization is adequate to provide optimum iodine nutrition to the population. Therefore, present study was carried out to assess the thyroid status among neonates in Gautam Budha Nagar District UP. Although some similar studies have been conducted nationally, there are no data available about the thyroid status of the neonates in Gautam Budha Nagar district.

MATERIAL AND METHOD

The observational multi-centric hospital based study was conducted over a period of 2 years from 2014 to 2016. Two hundred and thirty two neonates (37 Healthy subjects used as Control and 195 newborns used as patients) were selected of pregnant mothers. The neonates were selected randomly with probability proportion to the number of deliveries. Ethical approval was obtained from Ethical Committee. All mothers of newborn were healthy and none experienced complications during the pregnancy or delivery. The venous blood was collected by a trained staff nurse or pediatrician. 3ml venous blood sample was collected in a plain vacutainer tube and centrifuged at 4500 RPM for 15 minutes. Serum TSH level analyzed to access the sex difference in thyroid function in study neonates.

RESULTS

The descriptive data was given as mean ± standard deviation. The differences were considered to be statistically significant when the P value obtained < 0.05. The total 37 normal subjects used as a control. The mean ± SD of serum TSH levels in control group subjects was 2.80 ± 2.41 uIU/ml.

The Table 2 shows the age-wise distribution of the subjects who were divided into three groups. Group 1 included neonates in the age range of 1–3 days and there were 116 neonates in this group. Group 2 included neonates in age group of 4-6 days and there were 72 neonates in this group and Group 3 included neonates in age group of 7-25 days and there were 07 neonates in this group. The mean ± SD of serum TSH levels in group 1 was was 6.50 ± 2.99 uIU/ml. The serum TSH was normal in 95.68% neonates. It was observed higher in 4.31% of the neonates in group 1.

The mean ±SD of serum TSH in group 2 was 4.11 ± 2.98 uIU/ml. The serum TSH Levels were normal in 97.22% and observed higher in 2.78%.

The mean ±SD of serum TSH in group 3 was 4.33 ±1.94 uIU/ml. The serum TSH Levels were normal in 100% and no one observed in higher range. The observed TSH p value was <0.5 which was statistically significant.

The Table 3 shows the sex wise distribution of the neonates. There were 110 male and 85 females under study. It was seen that males (n=110) were more in number as compared to females (n=85) in the subjects under study. On the other hand healthy male (n=18) and Female (19) subjects used as a control.

The table 3 shows the comparison of serum TSH in males and females amongst the subjects under study. The serum TSH was normal in 97.27% males (n=110) and observed higher in 2.73%. The mean ±SD of serum
TSH in males was $5.25 \pm 2.90$ uIU/ml but in case of females (n=85) the observed mean ±SD was $5.91 \pm 3.46$ uIU/ml. The mean serum TSH level was higher in females as compared to male subjects.

**Table No 1: TSH levels among neonates control subjects**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Numbers (n) Control Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>18</td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
</tr>
<tr>
<td>Male+Female (n)</td>
<td>37</td>
</tr>
</tbody>
</table>

Mean±SD (TSH) in venous blood Control Group

<table>
<thead>
<tr>
<th>Sex</th>
<th>Numbers (n) Control Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>18</td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
</tr>
<tr>
<td>Male+Female (n)</td>
<td>37</td>
</tr>
</tbody>
</table>

Mean±SD (TSH) in venous blood Control Group

<table>
<thead>
<tr>
<th>TSH level</th>
<th>Age Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-3 (days)</td>
<td>4-6 (days)</td>
</tr>
<tr>
<td>Normal</td>
<td>111(95.68%)</td>
<td>70(97.22%)</td>
</tr>
<tr>
<td>Higher</td>
<td>05(4.31%)</td>
<td>02(2.78%)</td>
</tr>
<tr>
<td>Lower</td>
<td>Nil</td>
<td>NIL</td>
</tr>
</tbody>
</table>

p value 0.0001

<table>
<thead>
<tr>
<th>TSH level</th>
<th>Age Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-3 (days)</td>
<td>4-6 (days)</td>
</tr>
<tr>
<td>Normal</td>
<td>116</td>
<td>72</td>
</tr>
</tbody>
</table>

Mean±SD

\[ 6.50 \pm 2.99 \]
\[ 4.11 \pm 2.98 \]
\[ 4.33 \pm 1.94 \]

p value < 0.05; Significant

**Table No 3 Sex wise distribution of the neonate.**

<table>
<thead>
<tr>
<th>TSH level</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>107(97.27%)</td>
<td>81(95.29%)</td>
<td>188</td>
</tr>
<tr>
<td>Higher</td>
<td>03(2.73%)</td>
<td>04(4.71%)</td>
<td>07</td>
</tr>
<tr>
<td>Lower</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TSH level</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>110</td>
<td>85</td>
<td>195</td>
</tr>
</tbody>
</table>

Mean±SD

\[ 5.25 \pm 2.90 \]
\[ 5.91 \pm 3.46 \]
Table No 4 Genetic Causes of Congenital Hypothyroidism.

<table>
<thead>
<tr>
<th>Defective Gene Protein</th>
<th>Inheritance</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROP-1</td>
<td>Autosomal recessive</td>
<td>Combined pituitary hormone deficiencies with preservation of adrenocorticotropic hormone</td>
</tr>
<tr>
<td>PIT-1</td>
<td>Autosomal recessive</td>
<td>Combined deficiencies of growth hormone, prolactin, thyroid – stimulating hormone(TSH)</td>
</tr>
<tr>
<td></td>
<td>Autosomal dominant</td>
<td></td>
</tr>
<tr>
<td>TSHβ</td>
<td>Autosomal recessive</td>
<td>TSH deficiency</td>
</tr>
<tr>
<td>TTF-1 (TITF-1)</td>
<td>Autosomal dominant</td>
<td>Variable thyroid hypoplasia, choreoathetosis, pulmonary problems.</td>
</tr>
<tr>
<td>TTF-2 (FOXE-1)</td>
<td>Autosomal recessive</td>
<td>Thyroid agenesis, choanal atresia, spiky hair</td>
</tr>
<tr>
<td>PAX-8</td>
<td>Autosomal dominant</td>
<td>Thyroid dysgenesis</td>
</tr>
<tr>
<td>TSH- receptor</td>
<td>Autosomal recessive</td>
<td>Resistance to TSH</td>
</tr>
<tr>
<td>Albright hereditary osteodystrophy</td>
<td>Autosomal dominant</td>
<td>Resistance to TSH</td>
</tr>
<tr>
<td>Na/I symporter</td>
<td>Autosomal recessive</td>
<td>Inability to transport iodide</td>
</tr>
<tr>
<td>THOX2</td>
<td>Autosomal dominant</td>
<td>Organification defect</td>
</tr>
<tr>
<td>Thyroid peroxidase</td>
<td>Autosomal recessive</td>
<td>Defective organification of iodide</td>
</tr>
<tr>
<td>Thyroglobulin</td>
<td>Autosomal recessive</td>
<td>Defective synthesis of thyroid hormone</td>
</tr>
<tr>
<td>Pendrin</td>
<td>Autosomal recessive</td>
<td>Pendred syndrome: sensorineural deafness and partial organification defect in thyroid</td>
</tr>
<tr>
<td>Dehalogenase 1</td>
<td>Autosomal recessive</td>
<td>Loss of iodide reutilization</td>
</tr>
</tbody>
</table>


DISCUSSION

This assay may be used to identify neonates with congenital hypothyroidism caused by lack of maternal iodine nutrition. The reason for this association would be the lack iodine intake during pregnancy and may have induced the elevated TSH in neonates. Congenital hypothyroidism (CH) is one of the most common preventable causes of mental retardation in newborns. Early diagnosis and treatment leads to prevention of mental retardation in newborns. In India an estimated 10,000 babies are born with congenital hypothyroidism every year [8,9]. Recently, countries like Philippines and China too have commenced the screening because waiting for a symptomatic diagnosis of affected infants mean the baby will never be normal [10,11]. The incidence of Congenital Hypothyroidism (CH) in India Varied from 1 in 476 in one study [12] and 1 in 1,700 in another study [13] which is higher than population based incidences reported in Western Countries. [14,15] However, the exact incidence of CH in India is not known; this is largely due to the fact that neonatal screening is still not Universal in India and is only sporadically implemented at local health systems. Newborn Screening (NS) Universal NS for Congenital Hypothyroidism (CH) has been implemented in the United States, Canada, Western Europe, Japan, Australia, New Zealand, Taiwan, parts of China, parts of Mexico and Israel. However, Universal NS is still under development in other developing countries across Asia and Africa.
In the past decade NS is done by filter paper techniques collecting blood on a filter paper by heel prick on the second to the fifth day of life, then sent to a Central laboratory for testing to screen the neonates for CH for newborn screening and in some programs test total T4 and follow up with TSH if T4 was abnormal and other programs test for TSH. But in these days the initial testing of TSH allows for detecting subclinical hypothyroidism in view of normal T4 value while initial testing of total T4 allows detection of Central hypothyroidism in the setting of normal or low TSH. If either T4 or TSH were the initial testing and was abnormal, the other value needs to be followed. Most NS programs have switched to initial testing of TSH only. If CH newborn is left untreated it results in various degrees of neurologic and physical growth impairments. It is imperative for physicians in Countries where newborn screening is not implemented to be familiar with the classical presentation of CH. All infants with a low T4 concentration and a TSH concentration greater than 40 uIU/ml are considered to have congenital hypothyroidism and should have immediate confirmatory serum testing. If the TSH concentration is slightly elevated but less than 40 uIU/ml, a second screening test should be performed on a new sample. Results should be interpreted using age-appropriate normative values (the TSH reference range at two to six weeks of age, the most common period of retesting). Once the diagnosis is suspected by either an abnormal NS or by Clinical suspicion then serum testing of T4 and TSH needs to be done. Timely initiation and maintain treatment of CH is very important to effect adequate neurocognitive development during the critical first 3 years of life. Not only delaying the start of treatment should be avoided, but also optimal treatment should be ensured to maintain normal thyroid hormone levels.

**CONCLUSION**

There is requirements for the routine assay of thyroid hormones in neonates as a child with undiagnosed CH will have low IQ, delay in speech and language development, and decreased attention and memory skills. Moreover, children with CH who are started on supplemental thyroid therapy within the first few weeks of life “have a normal or near-normal neuro developmental outcome”. It is therefore important for these patients to receive early treatment and close follow up.

**Ethical Clearance:** Ethical approval was obtained from Ethical Committee.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**


The Prevalence of Restless Leg Syndrome in Iraqi Multiple Sclerosis Patients

Sajid I Al-Hussainy1, Aqeel K Hatem2

1 Consultant Neurologist, Nursing Home Hospital, Medical City, Baghdad, Iraq, 2 Consultant Neurologist, Baghdad Teaching Hospital, Medical City, Lecturer, Baghdad College of Medicine, Iraq

ABSTRACT

Background: Multiple sclerosis (MS) is an autoimmune disease characterized by chronic inflammation, demyelination, gliosis (scarring) and neuronal loss of the central nervous system.

Objective: This study aimed to determine the prevalence and possible risk factors for restless leg syndrome in Iraqi MS patients.

Method: A cross-sectional study included 110 patients meeting the 2010 McDonald criteria for the diagnosis of MS who attended the MS clinic at Baghdad teaching hospital from the first of February 2016 to the first of February 2017. Patient were examined by two neurologist and evaluated by Cambridge Hopkins Restless leg syndrome (RLS) questionnaire (CH-RLSq) for the presence of RLS.

Results: Nineteen Multiple sclerosis patients (17.3%) had Restless leg syndrome. Older age, longer disease duration, higher EDSS score, pyramidal and sensory functional system involvement were significant risk factors to develop RLS. Restless leg syndrome was significantly associated with MS with a prevalence of 17.3%.

Conclusions: Higher expanded disability status scale score and pyramidal system involvement were the strongest predictors to develop RLS. Special score can be applied to patients with MS to predict their probability to develop RLS.

Keywords: Restless leg syndrome, multiple sclerosis, Inflammatory process

INTRODUCTION

Multiple sclerosis (MS) is an autoimmune disease characterized by chronic inflammation, demyelination, gliosis (scarring) and neuronal loss of the central nervous system (CNS).1, 2 MS attacks the myelinated axons in the CNS, destroying the myelin and the axons to varying degrees resulting in a range of signs and symptoms, including physical, mental, and sometimes psychiatric problems.3, 4

Multiple sclerosis typically affect the white matter of brain and spinal cord along with evidence of inflammation affecting the normally appearing white matter and gray matter, cortex and deep gray matter nuclei.5 On the other hand Restless legs syndrome (RLS) is a sensorimotor disorder Characterized by a distressing urge to move the legs and in some cases, other parts of the body such as the arms.

One major theory of RLS causation is that a deficiency in brain iron, particularly within dopamine-containing neurons of basal nuclei, which may be caused by the ongoing inflammatory process due to MS, may predispose to RLS as brain iron deficiency leads to a dysfunction of the dopamine pathways whose abnormal function causes the symptoms of RLS.

METHOD

A cross sectional study was made on 110 MS patients, these patients were selected to reflect our MS population in term of age, gender and duration of disease at MS clinic of Baghdad teaching hospital from first of February 2016 to the first of February 2017. The diagnosis of multiple sclerosis was made according to
All MS patients in this study were examined by two consultant neurologists and the following criteria were evaluated for MS patients: age, sex, MS course, MS duration, functional systems were assessed by clinical examination and according to expanded disability status scale (EDSS) score.

An interview guided by a Cambridge-Hopkins RLS questionnaire (CH-RLSq) was applied to all of the patients. The temporal relation between the onset of RLS and MS (before or after the onset of MS) was questioned if RLS was present in the MS patients. RLS was suspected if the patient fulfilled all four criteria according to the International Restless Legs Syndrome Study Group (IRLSSG). Patients with secondary causes of RLS including iron deficiency anemia, hypothyroidism, renal impairment, diabetes mellitus and pregnancy and patients with positive family history of RLS were excluded. Statistical analysis was performed using the statistical package for social sciences (SPSS) version 20, minitab version 17.0 and medcalc version 14.8 software package, P.value ≤ 0.05 was considered to be significant

**RESULTS**

The prevalence of RLS in MS patients was (17.3%), while the remaining. Patients with RLS were significantly older than those without RLS, mean age was 40 years (median IQR 35-45 years) in MS/RLS+ compared to 24 years (median IQR 21-33 years) in MS/RLS- patients (P <0.001). Among the 19 RLS patients; 15 (78.9%) were females. No statistically significant association had been found neither with gender nor types of MS, (P>0.05),(Table 1).

Only sensory and pyramidal systems involvement were significantly associated with RLS. Among the 30 MS patients who had sensory functional system involvement 10 had RLS, (P=0.006) and among 33 MS patients who had motor functional system involvement 14 had RLS, (P <0.001), (Table 2).

Univariate analysis showed that EDSS score had an odd ratio of 12.9 which carries the higher risk followed by pyramidal functional system involvement with odd ratio of 10.6, sensory functional system involvement, MS duration and age, odd ratio was 3.9, 1.4 and 1.1 respectively. On multivariate analysis EDSS score was the only independent significant predictor to RLS ( P value = 0.005), (Table 3)

Table 4 and figure 1 demonstrate the results of receiver operating characteristics (ROC) curve for the validity of EDSS score its individual components. The value of the area under the curve (AUC) indicated that the prediction ranged from fair in pyramidal system involvement to excellent in the total score. Different cut off points of these predictors were assessed. The highest AUC value (0.977) was obtained for the total score, which is higher than each individual predictor risk factor and a cut-off point less than 5 has the highest sensitivity and specificity thus, in the presence of clinical suspicion for the diagnosis of RLS in a patient with MS, this score is the most sensitive and specific predictor for RLS in this study with sensitivity of 100% and specificity of 86.81%.

**Table 1. Age , gender and MS subtype distributed by RLS**

<table>
<thead>
<tr>
<th></th>
<th>Not RLS</th>
<th>RLS</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number (%)</strong></td>
<td>91 (82.7)</td>
<td>19 (17.3)</td>
<td>110</td>
<td>-</td>
</tr>
<tr>
<td><strong>Age (years)</strong>**</td>
<td>Median (IQR*)</td>
<td>24 (21 – 33)</td>
<td>40 (35 – 45)</td>
<td>28 (22 – 39)</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>17 – 56</td>
<td>28 – 55</td>
<td>17 – 56</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>Female n (%)</td>
<td>59 (64.8)</td>
<td>15 (78.9)</td>
<td>74 (67.3)</td>
</tr>
<tr>
<td></td>
<td>Male n (%)</td>
<td>32 (35.2)</td>
<td>4 (21.1)</td>
<td>36 (32.7)</td>
</tr>
<tr>
<td><strong>MS subtype</strong></td>
<td>RRMS</td>
<td>72 (79.1)</td>
<td>16 (84.2)</td>
<td>88 (80.0)</td>
</tr>
<tr>
<td></td>
<td>SPMS</td>
<td>14 (15.4)</td>
<td>2 (10.5)</td>
<td>16 (14.5)</td>
</tr>
<tr>
<td></td>
<td>PPMS</td>
<td>5 (5.5)</td>
<td>1 (5.3)</td>
<td>6 (5.5)</td>
</tr>
</tbody>
</table>

*IQR: interquartile range*
### Table 2. Distribution of functional system involvement by RLS

<table>
<thead>
<tr>
<th></th>
<th>Not RLS (n = 91)</th>
<th>RLS (n = 19)</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Sensory</td>
<td>20</td>
<td>22.0</td>
<td>10</td>
<td>52.6</td>
</tr>
<tr>
<td>Pyramidal</td>
<td>19</td>
<td>20.9</td>
<td>14</td>
<td>73.7</td>
</tr>
<tr>
<td>Cerebellar</td>
<td>14</td>
<td>15.4</td>
<td>2</td>
<td>10.5</td>
</tr>
<tr>
<td>Visual</td>
<td>22</td>
<td>24.2</td>
<td>3</td>
<td>15.8</td>
</tr>
<tr>
<td>Brain stem</td>
<td>18</td>
<td>19.8</td>
<td>3</td>
<td>15.8</td>
</tr>
<tr>
<td>Sphincter</td>
<td>12</td>
<td>13.2</td>
<td>4</td>
<td>21.1</td>
</tr>
</tbody>
</table>

### Table 3. Univariate and multivariate analysis for the correlation of RLS and other variables

<table>
<thead>
<tr>
<th></th>
<th>Univariate analysis</th>
<th>Multivariate analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95%CI</td>
</tr>
<tr>
<td>Age</td>
<td>1.105</td>
<td>1.051 – 1.161</td>
</tr>
<tr>
<td>MS duration</td>
<td>1.474</td>
<td>1.254 – 1.733</td>
</tr>
<tr>
<td>EDSS score</td>
<td>12.948</td>
<td>1.254 – 1.733</td>
</tr>
<tr>
<td>Sensory</td>
<td>3.944</td>
<td>1.411 – 11.029</td>
</tr>
<tr>
<td>Pyramidal</td>
<td>10.611</td>
<td>3.396 – 33.167</td>
</tr>
</tbody>
</table>

### Table 4. Results of ROC curve analysis for the validity of score and its components

<table>
<thead>
<tr>
<th></th>
<th>AUC</th>
<th>P value</th>
<th>Cut point</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.832</td>
<td>&lt;0.001</td>
<td>&gt;29</td>
<td>100%</td>
<td>67.03%</td>
<td>38.8%</td>
<td>100%</td>
</tr>
<tr>
<td>MS duration</td>
<td>0.907</td>
<td>&lt;0.001</td>
<td>&gt;4</td>
<td>100%</td>
<td>71.43%</td>
<td>42.2%</td>
<td>100%</td>
</tr>
<tr>
<td>EDSS score</td>
<td>0.971</td>
<td>&lt;0.001</td>
<td>&gt;2.5</td>
<td>94.74%</td>
<td>91.21%</td>
<td>69.2%</td>
<td>98.8%</td>
</tr>
<tr>
<td>Sensory</td>
<td>0.653</td>
<td>0.0146</td>
<td>-</td>
<td>52.63%</td>
<td>78.02%</td>
<td>33.3%</td>
<td>88.7%</td>
</tr>
<tr>
<td>Pyramidal</td>
<td>0.764</td>
<td>&lt;0.001</td>
<td>-</td>
<td>73.68%</td>
<td>79.12%</td>
<td>42.4%</td>
<td>93.5%</td>
</tr>
<tr>
<td>Score</td>
<td>0.977</td>
<td>&lt;0.001</td>
<td>&lt;5</td>
<td>100%</td>
<td>86.81%</td>
<td>61.3%</td>
<td>100%</td>
</tr>
</tbody>
</table>
DISCUSSION

In this study, there was a significant association between MS and RLS, where the prevalence of RLS in MS patients was 17.3%. This is approximately two times the prevalence of RLS in general population which is 5-10%.(7) This is similar to other studies done in Turkey, Italy, France and Brazil in which the prevalence of RLS in MS patients 8-11. Canadian study showed a prevalence of 37.5%. This can be explained by the higher prevalence of MS in distant equator 12.

Regarding the high prevalence of RLS in MS patient, the exact cause is still unknown, however, one major theory of RLS causation is that a deficiency in brain iron, particularly within dopamine-containing neurons of basal nuclei, which may be caused by the ongoing inflammatory process and plaque formation due to MS, may predispose to RLS as brain iron deficiency leads to a dysfunction of the dopamine pathways whose abnormal function causes the symptoms of RLS. This concept may be supported by the therapeutic effect of dopaminergic therapeutic agents13. In our study, a significant association between older age of patients and their liability to have RLS, this finding is supported by an Italian REMS study9. This can be possibly explained by the fact that increasing age is associated with more inflammatory damage and plaque formation in the dopamine containing neurons and their connections in the brain and greater pyramidal and sensory disease burden which is also shown to be significant in this study and other studies. Gender did not appear to be a significant risk factor to develop RLS, two studies support this finding including the Italian REMS study and Turkish study 9,8.

This study showed no significant association between MS subtypes and RLS supported an earlier Italian study carried out by Deriu et al at 2009 14 and the Turkish study in 2015. Other studies did show a relation between MS course and RLS9, from other point of view, a French study by Douay et al at 2009 showed an association between relapsing-remitting MS and RLS 10. The discrepancy in findings could be attributed to sample size variations among the studies.

A significant relationship between MS duration and the risk of RLS has been documented in the present study which agreed that found in the Italian REMS study9. A possible explanation of that is the longer duration of MS the longer ongoing inflammation and plaque formation and more prone to have pyramidal and sensory functional system involvement which in turn has been strongly associated with the risk of developing RLS. In our study there was a significant relationship between functional system involvement and the presence of RLS, this is especially true for the motor and sensory system involvement while other systems including cerebellar,
brainstem, visual and sphincter did not show association with the risk of having RLS.

Only three studies have evaluated functional system involvement and the presence of RLS to date. The Italian REMS study by Manconi et al. showed pyramidal and sensorial functional system scores were higher in MS/RLS+ patients than in MS/RLS− patients.9

Aydar et al. showed that there was a significant relationship between the pyramidal symptoms and bladder dysfunction, and RLS. In contrast, Deriu et al. did not find any relationship between the presence of RLS and functional system involvement.14,15

However, previous studies have already reported cases of RLS secondary to lesions that interrupt the descending motor pathways at the spinal cord level due to different etiologies16–21. Although less supported by evidence-based data, the symptoms of RLS have been shown to correlate with impairment of ascending sensory pathways, as a result of a central somatosensory processing dysfunction due to an abnormal peripheral afferent input. 22 In the pathogenesis of this RLS form, a possible role of damage in gray matter nuclei, in glial tissue, or in peripheral fibers because of Wallerian degeneration, which have been all demonstrated to occur in MS, 13–25 cannot be excluded.

This study found a significant relationship between higher global EDSS score and the risk of developing RLS which was consistent with earlier studies 9, 11, 26.

**CONCLUSIONS**

1. RLS is significantly associated with MS. Predictor risk factors were high expanded disability status score, pyramidal and sensory disability, longer MS duration and older age. These results strengthen the idea that the inflammatory damage correlated with MS may induce a secondary form of RLS.

2. The prompt identification of RLS symptoms, especially in MS patient who complain from lack of sleep leads to proper treatment with dramatic improvement of the patient quality of life.

3. The presence of RLS in MS patients can be evaluated using a score which had not been evaluated by any previous study.

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

**Source of Funding-** Self funded

**Ethical clearance and consent:** Data of participants were collected according to the Declaration of Helsinki, and signed informed consent was obtained from each participant who was informed about the nature and the main outcome of the study. The study was approved by the ethics committee of Baghdad medical city, and Baghdad Medical college.

**REFERENCES**


Factors affecting the Performance of Members Team Preparation Accreditation of Public Health Center
(Study at Public Health Center in Kotawaringin Timur District)

Nurul Fatimah Apriliani¹, Edi Har toyo², Lenie Marlinae³, Husaini², Bahrul Ilmi⁴

¹Student of Public Health Magister Program, ²Magister Public Health Science Program Medical Faculty, ³Enviroment Health Department Public Health Program Medical Faculty, ⁴Health Polytechnic Ministry of Health Banjarmasin

ABSTRACT

Background: Accreditation of Public Health Center as a quality assurance requires high performing teams. 2017 is scheduled 7 health centers in East Kotawaringin carry out accreditation assessment. Report of self assessment from Accompanying Team of Public Health Center Accreditation of Health Office of Kotim July 2017 period describes Public Health Center Baamang I with target of preparation of accreditation supporting document as much as 60% result realized is 30%, Public Health Center Ketapang I 30%, Public Health Center Pasir Putih 45%, Public Health Center Parenggean II 75%, Public Health Center Samuda 50%, Public Health Center Mentaya Seberang 45% and Public Health Center Kota Besi 50%. The performance of members of the Public Health Center accreditation preparation team has not met the agreed targets.

Objectives: Analyzing the influence of leadership of Public Health Center head, organizational culture and motivation on the performance of the preparation team members of Public Health Center accreditation.

Method: Survey research using crosssectional design. Proportional random sampling technique was applied to recruit 110 respondents from 4 selected Public Health Centers. Questionnaires were used to collect data on the independent variables (leadership, organizational culture and motivation) and dependent variables (performance).

Results: Fisher Exact test showed no influence of leadership on performance (p-value 1,000), no influence of organizational culture on performance (p-value 0.373), no effect of motivation on performance (p-value 1,000). Age, employment, education, gender and employment status seem to contribute to the results of the study.

Conclusion: There is no statistically significant influence from the leadership of the Head of Public Health Center, organizational culture and motivation to the performance of members of the preparation team for accreditation of Public Health Center. Therefore it is necessary to analyze other factors that affect the performance of the preparation team members of the Public Health Center accreditation.

Keywords: Leadership, Organizational Culture, Motivation, Performance.

INTRODUCTION

Public Health Center accreditation is an external assessment process by the Accreditation Commission and representatives in the province against the Public Health Center to assess the quality management system and service delivery system as well as the principal efforts with conformance to the established standards. The Public Health Center accreditation assessment standard consists of 9 Chapters, namely: Chapter I. The Implementation of Public Health Center Services, Chapter II. Leadership and Management Public Health
Center, Chapter III. Improving the Quality of Public Health Center, Chapter IV. Target-oriented Public Health Center Program, Chapter V. Leadership and Management of Public Health Center Program, Chapter VI. MDG’s Performance Targets, Chapter VII. Patient-Oriented Clinical Services, Chapter VIII. Clinical Support Service Management, and Chapter. IX. Improved Clinical and Patient Safety. The accreditation decision is Not Accredited: Basic Accredited, Accredited Madya, Accredited Primary and Accredited Plenary1.

The accreditation preparation team established in each Public Health Center is divided into 3 (three) working groups namely the administrative and management, the individual health work group and the public health work group with the task of carrying out the self assessment and the preparation of the required documents, carry out the implementation and then performed pre-accreditation assessment and ending the preparation with the submission of a request for survey. In general the task of the team is: 1) to prove that the quality assurance system has been standardized; 2) prove the quality assurance system is running; 3) to prove that the running of the system has been in accordance with the procedure; 4) to prove the success of the quality assurance system undertaken; and 5) proves that system weaknesses have been fixed through a standardized quality cycle. All five of the above shall be proved by documents (papers) and other evidence1.

Directorate General of Health Services (DG Yankes) Ministry of Health Republic of Indonesia (Kemenkes RI) reports that coverage of Public Health Center accreditation in Indonesia in 2016 is as many as 1,479 Public Health Center spread in 1,308 districts, 320 districts and 34 provinces. Realization in 2016 only reached 23.4% compared to the target of 2019. The problems that prevented the preparation of Public Health Center accreditation were human resources, fund, time and infrastructure. These factors include the unwillingness of working from health workers at the Public Health Center, the lack of competent human resources, the low level of regional commitment, and the availability of facilities for health service facilities (fasyankes) that have not met the standard2.

Kotawaringin Timur Regency, Central Kalimantan Province consists of 17 districts with 182 villages. The parent health center in Kotim in 2016 amounted to 22, consisting of 5 health centers and 17 non-treatment Public Health Center. Public Health Center accreditation was implemented in 2016. From 22 Public Health Center, there are 2 (two) Public Health Center which in 2016 are ready to be accredited and get Basic Accredited status. Based on the results of monitoring and evaluation at Kotim District Health Office on April 22, 2017 that the achievement of accredited status is not in accordance with the target set. 2017 is scheduled 7 health centers again to implement the accreditation of Public Health Center Samuda, Kota Besi, Mentaya Seberang, Parenggean II, Pasir Putih, Baamang I and Ketapang I. The accreditation preparation team from each Public Health Center has conducted appeal and benchmarking to other public health centers has a status of Accredited Madya in West Kotawaringin Regency (Kobar) with facilitated by DHO Kotim3.

Public Health Center Baamang I with the target of preparation of accreditation supporting documents as much as 60% of the realized result is 30%. Public Health Center Ketapang I with target of preparation of accreditation supporting document as much as 65% result realized is 30%. Public Health Center Pasir Putih with target of preparation of supporting document of accreditation as much as 60% result realized is 45%. Public Health Center Parenggean II with the target of preparation of accreditation supporting documents as much as 80% of the realized result is 75%. Public Health Center of Samuda with target of preparation of supporting document of accreditation as much as 60% result realized is 50%. Public Health Center Mentaya Seberang with the target of preparation of accreditation supporting documents as much as 60% of realized result is 45%. Public Health Center Kota Besi with target of preparation of accreditation supporting document as much as 60% result realized is 50%3.

The result of monitoring of accreditation accompaniment team above shows that in general performance achievement in each Public Health Center is still low. The average achievement of performance is 30% -50% and only 1 health center that can achieve the realization of 75% of the 80% agreed targets. Accreditation requires the provision of the implementation of all service activities through documentation and tracing, because on the principle of accreditation, all activities must be written and what is written must be done accordingly. The results of the preliminary study indicate that in general in the preparation of documents and other physical evidence,
Public Health Center Parenggean II has the highest performance while the Baamang I and Ketapang I Public Health Center have the lowest performance. Based on the above data review, it is necessary to know what factors affect the performance of the preparation team of Public Health Center accreditation in East Kotawaringin regency.

**MATERIALS AND METHOD**

This research use cross sectional design, this research data is collected by quantitative approach to analyze the influence factor of leadership, organizational culture and motivation to the performance of member of preparation team of accreditation of Public Health Center in Kotawaringin Timur area. The study was conducted in 4 health centers from 7 health centers that were included in the road map of Kotawaringin Timur District Health Office in 2017, Baamang Unit I, Pasir Putih Public Health Center, Public Health Center Parenggean II and Public Health Center Samuda. Public Health Center Baamang I and Public Health Center Pasir Putih were chosen to represent Public Health Center in the capital of East Kotawaringin District while Public Health Center Parenggean II and Public Health Center of Samuda were chosen to represent Public Health Center outside the capital of Kotawaringin Timur Regency. The study was conducted from September to December 2017.

The population in this study are all members of the accreditation preparation team in 4 Public Health Center divided into 3 working groups (Pokja), namely Pokja Admen (Administration and Management), Pokja UKP (Individual Health Efforts) and Pokja UKM (Public Health Efforts). The sample was determined using Lameshow formula with 110 respondents which then divided based on the proportion to the number of samples consisting of 39 respondents from the Baamang I health center accreditation team, 18 respondents from the accreditation team of Pasir Putih Public Health Center, 18 respondents from the accreditation team of Parenggean and 35 respondents from the Samuda Public Health Center accreditation team.

**FINDINGS**

Table 1: Results of univariat analysis

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Leadership</td>
<td>Strong</td>
<td>108</td>
<td>98.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weak</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>2</td>
<td>Organizational culture</td>
<td>Very strong</td>
<td>41</td>
<td>37.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strong</td>
<td>69</td>
<td>62.7</td>
</tr>
<tr>
<td>3</td>
<td>Motivation</td>
<td>Strong</td>
<td>99</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weak</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Performance</td>
<td>Good</td>
<td>109</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Less</td>
<td>1</td>
<td>17.1</td>
</tr>
</tbody>
</table>

Based on table 1 it is known that respondents’ assessment on the leadership of the Head of Public Health Center is strong at 108 (98.2%). While the respondents’ assessment of the leadership of the Public Health Center Head is weak by 2 (1.8%). Based on table 1 dataahui that the assessment of respondents to a very strong organizational culture amounted to 41 (37.3%). While the assessment of respondents to a strong organizational culture of 69 (62.7%). Based on table 1 it is found that respondent motivation shows most of the motivation of members of the preparation team for accreditation of East Kotawaringin Public Health Center is strong (99%) compared to the weak motivation of 11 (10%). Based on table 1 it is known that the performance of respondents shows that most of the performance of members of the preparation team for accreditation of Public Health Center in Kotawaringin Timur Regency is good 109 (99.1%) compared to the performance of less than 1 (0.9%).

Table 2: Analysis Bivariate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Kinerja Anggota Tim</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baik</td>
<td>Kurang</td>
</tr>
<tr>
<td>Leadership</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Strong</td>
<td>107</td>
<td>99.1</td>
</tr>
<tr>
<td>Weak</td>
<td>2</td>
<td>100</td>
</tr>
</tbody>
</table>
Cont... Table 2: Analysis Bivariate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Kinerja Anggota Tim</th>
<th></th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Baik</td>
<td>Kurang</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very strong</td>
<td>97.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strong</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motivation</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weak</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on table 2 of Fisher Exact test result with level of trust ($\alpha$) 95% (0.05) got significant value (p-value = 1,000). This means the value of $P > \alpha$, it can be concluded that there is no influence of leadership with the performance of members of the preparation team of accreditation of Public Health Center. Based on table 4.12 using Fisher Exact test with level of trust ($\alpha$) 95% (0.05) to see the existence of influence between organizational culture with performance level of accreditation team member got value (p-value = 0.373). This means p-value > $\alpha$, it can be concluded that there is no influence between organizational culture with the performance of Public Health Center accreditation team members. Based on table 4.13 Using Fisher Exact test with 95% (0.05) confidence level ($\alpha$) to see the influence between motivation and level of performance of accreditation team member got significant value (p-value = 1,000). This means p-value > $\alpha$, so it can be concluded that there is no influence of motivation with the performance of Public Health Center accreditation team members.

**DISCUSSION**

There is no significant correlation between head of Public Health Center leadership and performance in this research is in line with the research done by Tampubolon (2017) which shows no influence of leadership of Head of Public Health Center with the performance of officer at Public Health Center Bitung Barat Kota with p-value = 0.620. Endro and Sujiono (2012) also concluded that there was a meaningless influence between leadership on performance. As the relationship of leadership and performance, then in the relationship between organizational culture and performance there is also anomaly perspective. About a third of Baamang I health center employees and Public Health Center Parengean consider their organization to have a very strong organizational culture and in the leadership perspective they have a good performing team. But in reality, the achievement of the accreditation obtained by the two is different. Anomaly is also seen in the White Pasir Public Health Center and Public Health Center of Samuda4.

The results of this study indicate that organizations that have good performance do not always have to have a strong organizational culture. According to Kotter and Heskett (1997) a strong organizational culture can produce effects that greatly affect performance. Strong organizational culture will assist the organization in providing assurance to all employees to grow together, grow and develop agencies. In other words, whatever organizational culture prevails throughout the culture is well managed according to the key elements of the culture then the goal will surely be achieved5.

During the research, the accreditation companion team has always been involved since providing early debriefing, conducting technical guidance for accreditation, providing assistance and participating in preparing the required documents. Intervention from outside this organization increases the rhythm of activity compared to everyday. But since the beginning of this change is not accompanied by clear targets, eventually the organization does not have a code of conduct in harmony with these target indicators.

The questionnaire analysis shows that the accreditation team always coordinates with colleagues and supervisors (71.85%), if there is any problem in completing the accreditation document then the team coordinates with colleagues and leaders (70.95%),
the accreditation team always issued (70.35%), the accreditation team is always looking for ways to overcome ignorance of accreditation documents as per the working group (68.85%), and the accreditation team always discuss with other working groups to correlate if there is a difference of (68.7%). The results of the questionnaire analysis show that the Public Health Center actually has a conducive climate to manage change and become a learning organization.

Motivation is an incentive from within man to act or behave. Understanding motivation is inseparable from the word needs or needs. Needs are a “potential” in man that needs to be responded to or responded to. The response to that need is manifested in the form of action to meet those needs, and the result is that the person concerned feels or becomes satisfied. According to the hierarchy of needs theory there are 5 levels of needs that did not show any relationship between motivation on employee performance.

The results of the questionnaire analysis showed that the accreditation team was determined to complete the preparation task of accreditation with the best result (67.65%), when the accreditation team was given the task of preparing the accreditation of the Public Health Center by the Head of the Public Health Center, the team felt challenged to finish it well (67.2 %), Public Health Center accreditation activities make team more friends because work in team equal to (68,85%), if Public Health Center accreditation succeed, hence it is achievement for team equal to (66,6%), and team feel very excited when went to Public Health Center because besides implementing tupoksi also have to finish task of preparation of accreditation of Public Health Center equal to (65,25%). Only 10% of respondents are generally weakly motivated.

CONCLUSION

1. There is no influence of leadership on the performance of members of the preparation team of Public Health Center accreditation (p-value = 1,000).

2. There is no influence of organizational culture on the performance of the preparation team members of the Public Health Center accreditation (p-value = 0.373).

3. There is no influence of motivation on the performance of members of the preparation team of Public Health Center accreditation (p-value = 1,000).

Ethical Clearance: This study approved and received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study we followed the guidelines from the Committee of Public Health Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for ethical clearance and informed consent. The informed consent included the research tittle, purpose, participant right, confidentiality and signature.

Source Funding: This study done by self funding from the authors.

Conflict of Interest: The authors declare that they have no conflict interest.

REFERENCES

1. Peraturan menteri kesehatan No.46 Tahun 2015 tentang akreditasi Puskesmas
Current Status of Voice Restoration Following Total Laryngopharyngoesophagectomy: A Case Report

Sheela S¹, Venkataraja U Aithal², Rajashekar B², Balakrishnan R³

¹Assistant Professor, ²Professor, Dept. of Speech and Hearing, School of Allied Health Sciences (SOAHS), Manipal Academy of Higher Education (MAHE), Manipal, Karnataka, India, ³Professor, Dept. of Otorhinolaryngology Unit II, Kasturba Medical College, Manipal, Karnataka, India

ABSTRACT

Hypopharyngeal carcinoma is one of the common head and neck cancers and also more common in men in India. Understanding of the role of the speech-language pathologist (SLP) in the area of assessment and management of this condition is limited. This is a case report of an adult male with recurrent squamous cell carcinoma of hypopharynx, spread to larynx and esophagus. Following total laryngopharyngoesophagectomy (TLPE) with gastric transposition, the patient was aphonie. This case report focuses on the voice restoration options available, that SLP needs to be aware right during pre-operative counselling and his/her role in rehabilitating TLPE patient with gastric transposition reconstruction.

Keywords: Hypopharyngeal carcinoma, TLPE with gastric reconstruction, Electrolarynx, INFVo

INTRODUCTION

Hypopharynx is the part of pharynx, extending from the floor of valleculae to the lower border of the cricoid cartilage. It is superiorly continuous with the oropharynx and inferiorly it continues as the cervical esophagus. The three subsites in hypopharynx are pyriform sinus, posterior pharyngeal wall (PPW) and post-cricoid region¹. When there is carcinoma of the PPW or post-cricoid region, extending to the cervical esophagus, total aryngopharyngoesophagectomy (TLPE), the surgical option becomes necessary. It includes the surgical excision of parts of the pharynx, larynx and esophagus. It is complicated and not a very common procedure. It offers the least amount of local recurrence². The voice restoration option following TLPE includes gastric speech, tracheojejunal speech (TJS), tracheogastric speech (TGS) and electrolaryngeal (EL) speech.

Gastric speech or gastric pull-up or gastric transposition (Figure 1) involves the replacement of esophagus by stomach. The source of vibration for voice production is stomach walls and pharyngo-gastric (PG) segment. However, loose and wide lumen of stomach results in reduced vibration and thereby poor quality of voice. Also, after intake of food, there will be no voice output, or the voice will be gurgly in nature.

Corresponding author:
Sheela S
Assistant Professor, Department of Speech & Hearing, School of Allied Health Sciences (SOAHS), Manipal Academy of Higher Education (MAHE), Manipal, Karnataka, India, E-Mail id: sheela.s@manipal.edu
Contact number: +91 820-2922061


Tracheojejunal speech (TJS) involves the TLPE with jejunal interposition (Figure 2). A piece of jejunum (small intestine) with its vascular supply is anastomosed in-between pharynx and stomach. Voice prosthesis is inserted into the tracheojejunal puncture (TJP). The
source of vibration for voice production is any narrow portion between pharynx, jejunum and stomach. As jejunum is a mucosa-lined flap, it produces excessive mucous discharge, offering ‘wet’ voice quality.

![Figure 2: Tracheojejunal speech](source)

**Figure 2: Tracheojejunal speech**


Tracheogastric speech (TGS) (Figure 3) involves the TLPE with gastric transposition. Stomach is anastomosed to the pharynx. Voice prosthesis is inserted into the tracheogastric puncture (TGP). The source of vibration for voice production is any narrow portion between pharynx and stomach. This gastric mucosa vibration results in mucous discharge resulting in a lower pitch, reduced intensity, slower rate, and a ‘wet’ quality of voice. Both TGS and TJS are surgical voice restoration modes. However, the quality of voice is perceptually better in TJS compared to TGS, because, relatively narrow lumen facilitates the better vibratory segment in TJS.

![Figure 3: Tracheogastric speech (TGS)](source)

**Figure 3: Tracheogastric speech (TGS)**


Electrolaryngeal speech (Figure 4) is produced from an artificial or electronic larynx (EL), which is an electrically driven diaphragm or sound transducer. Two types of artificial larynx are neck type/trans-cervical type and intra-oral type. In the neck type, the device is placed on the lateral side of the neck and activated electronically (4a). The generated mechanical sound is transmitted through the tissues of pharynx, hypopharynx and the oral cavity. Then, the transmitted sound is articulated by appropriate synchronized positioning of the various articulators. In the oral type (4b), the oral adaptor attached to the instrument directs the mechanical sound directly into the oral cavity. Learning to use the EL takes relatively shorter time and also acts as psychological booster to the patient. However, its conspicuous nature battery dependence, mechanical sound quality, and the need of hand to operate, limits its usage.

![Figure 4a: Electrolaryngeal speech -necktype; 4b: Electrolaryngeal speech -intraoral type](source)

**Figure 4a: Electrolaryngeal speech -necktype; 4b: Electrolaryngeal speech -intraoral type**

Source: http://headandneckcancerguide.org

Management of hypopharyngeal cancer is challenging to speech-language pathologist (SLP). Curing a patient of throat cancer and leaving him voiceless is criminal. Post-surgical loss of voice affects the psychological, social and economic aspects of the patient. The aim of this case report is to make SLPs aware of the voice restoration options available for TLPE and also educating on SLP’s role in rehabilitating TLPE patients with gastric transposition reconstruction.

**CASE REPORT**

The case aged 51 years adult male was diagnosed with advanced hypopharyngeal, post-cricoid and cervical esophageal squamous cell carcinoma (T1 N0 M0) and was recommended ‘TLPE with gastric transposition reconstruction’ surgery. Before surgery, the patient was counselled regarding different voice restoration methods such as gastric speech, TJP, TGP and electrolarynx in terms of surgical procedure, post-operative anatomical and physiological changes, approximate time needed to learn different restorative speech options, overall voice quality, cost, care and maintenance of the speaking valves. On post-operative visit of the patient, he opted the Servox (NJ, USA) neck type EL.
Servox is a battery-operated EL with scope for varying volume and pitch. The desired pitch was selected and ‘fine pitch adjustments’ were made by tightening or loosening the screw cap. The sound producing diaphragm of the device was placed against the patient’s external throat/neck beneath the jaw, a button was pressed and the EL diaphragm transmitted a vibratory noise to the pharynx. The location of placement of the device was adjusted until clearest production of phonation of “ah” was achieved through an open mouth. This vibratory noise was then transformed into different speech sounds with the exaggerated movement of articulators such as lips, jaw and tongue. Servox offers an option of soft tone screw cap, which can provide a softer tone compared to that of the standard cap.

Prior to speech therapy, the client was assessed for baseline communication skills and was found to be using gestural/written mode of communication. During therapy, the client was trained to speak at word, phrase and sentence levels in his native language (Kannada) for 10 sessions (45 minutes each) using his neck type EL. Following 10 sessions of therapy, the client was made to sit in a sound treated room (speech-science lab at our centre) and spontaneous speech at a comfortable pitch and loudness was elicited for five minutes and recorded.

All these speech samples were recorded using a Shure dynamic microphone (SM48) in Computerized Speech Lab (CSL model 4500, Kay Elemetrics, Lincoln Park, NJ) software at a sampling rate of 44kHz, placed at a distance of 15 cm from the patient’s mouth. Three qualified SLPs with a minimum of five years of experience in the area of alaryngeal voice rehabilitation were given the task of rating the voice quality of spontaneous speech sample using INFVo (impression, noise, fluency and voicing) scale. It is a clinician-rated multidimensional assessment protocol for the perceptual evaluation of substitute voice using four dimensions. ‘I’ reflects the overall voice quality as well as the overall acceptability and usefulness in serving communication purposes. ‘N’ reflects the amount of annoyance caused by the audibility of all sorts of uncontrolled noises, such as bubbly noise, breathy noise, clicks, etc., produced during speech. ‘F’ reflects the perceived smoothness of the sound production. Samples containing a lot of hesitations between successive sounds and within continuant sounds (e.g., vowels and some consonants) score badly. ‘Vo’ reflects the quality of voicing means that voicing is voiced or unvoiced, where it is supposed to be voiced or unvoiced. Each parameter was scored between 0 (very good substitution voicing) and 10 (very deviant substitution voicing) on a visual analogue scale (VAS). Later, the blinded recordings were played to three raters from two stereo speakers (HP, H-204) placed at a distance of one meter in a sound-treated room. The recordings were replayed as many times as necessary for the raters to come to a final decision on their rating.

**DISCUSSION**

The intra-class correlation coefficient (ICC) obtained across raters (R1-R2, R1-R3 and R2-R3) was 0.75 to 0.90 across INFVo dimensions. This score suggests that excellent substitution voice can be obtained using EL. SLPs need to be aware that voice restoration options such as GS, TGP and TJP have their own limitations in terms of time needed to learn the restorative speech, overall voice quality, cost, care and maintenance of the speaking valves, along with the surgical complications. In Indian context, EL is a most preferred and promising voice restoration option available for patients with TLPE.

**Conflict of Interest - Nil**

**Source of Funding- Self**

**REFERENCES**


4. SERVOX electrolarynx https://www.servona.com/productportfolio/products/homecare/servoxelectrolarynx/

5. Moerman MB, Martens JP, Van der Borgt MJ,

Clinical and Radiographic Comparison of Conventional and Minimal Invasive Method of Cavity Preparation in Mandibular Molars

Sonali Sharma¹, Mithra N Hegde², Vandana Sadananda³

¹Professor, Conservative Dentistry and Endodontics, Army Dental Centre; Research and Referral Hospital, Delhi, India; ²Vice Principal, Head of the Department, Department of Conservative Dentistry and Endodontics, A. B. Shetty Memorial Institute of Dental Sciences, Nitte (Deemed to be University), Deralakatte, Mangaluru, Karnataka, India; ³Lecturer, Department of Conservative Dentistry and Endodontics, A. B. Shetty Memorial Institute of Dental Sciences, Nitte (Deemed to be University), Deralakatte, Mangaluru, Karnataka, India

ABSTRACT

The study aimed at clinically evaluating air abrasion as an ultraconservative operative tool in early diagnosis and intervention of site 1, size 1 carious lesions. 50 patients fulfilling the inclusion criteria of site 1 size 1 lesion found bilaterally on first/second mandibular molar were included in the study and randomly assigned into 2 groups. Group A - Treatment modality - conventional cavity preparation. Group B - Treatment modality - ultra conservative cavity preparation by air abrasion. Restoration was done with posterior composite/flowable composite depending upon depth and extent of cavity. Postoperatively pain perception was noted by visual analogue scoring and preferred treatment modality was scored. Both the groups were evaluated clinically and radiologically at an interval of 3, 6, 9 and 12 months. Statistical analysis was done by student’s ‘t’ test to determine statistical difference between expired and survived in the parameters measured, Wilcoxon test for evaluating median survival time and Chi square test of significance for proportion analysis. Group A showed 5 biological failures and 5 mechanical failures which required replacement, whereas there were failures in Group B. Cavities produced were shallower and narrower in air abrasion group as compared to conventional method. Air abrasion offers the advantage of reducing chairside time, less pain, allays fear, reduces vibration. Air abrasion was the preferred treatment modality of the patients.

Keywords: Air abrasion, minimal invasive dentistry, site 1 size 1 carious lesions.

INTRODUCTION

Micro dentistry is centered on early diagnosis, intervention and preservation of tooth structure, which is a gargantuan step from the traditional principles of G.V Blacks principles of extension for prevention. Air abrasion is an adjunct of micro dentistry, which preserves the structural integrity of the sound tooth structure surrounding carious lesion.¹

Air abrasion was first clinically practiced by Robert Black in 1940 by using SS White’s Airdent. Despite showing promising results, the concept did not sustain, as the dental materials used then such as silver amalgam and gold required specific cavity designs which could not be achieved with air abrasion, further the concepts of bonding had not become an integral part of the practice then. In 1950 high speed handpieces, which reduced the time of cavity preparation, became popular, thus pushing air abrasion into oblivion. With the emergence of minimal intervention philosophy and of adhesive materials, the concept of air abrasion for cavity
preparation remerged.\textsuperscript{2-6}

Air abrasion propels a stream of aluminium oxide particles generated from compressed air. Air abrasive particles follow unsound tooth structure, turning at more than 90 degree angles as carious lesions are encountered and deflecting the abrasive air stream toward hypocalcific structures which are then abraded.\textsuperscript{1-6}

Clinically, air abrasion provides many benefits: unlike rotary instrumentation, it does not build up heat or cause microfracture of the tooth, it reduces vibration, is painless and obviates need for anesthesia. It can be used for all types of cavities.\textsuperscript{1-6} Thus it would be prudent to explore the possibility of it serving as an alternative ultraconservative operative tool.

**METHOD**

Patients above 18 years of age having initial pit and fissure caries (site 1 size 1 lesion) on first or second mandibular molar and their respective contralateral (antimere) indicated for restoration were screened and evaluated clinically and radiologically. Indices used for selection was Ekstrand criteria of clinical severity index for occlusal fissure carious lesions.

Group A – Control Group: Treated by standard conventional rotary instrumentation. (n=50)

Group B – Study Group: Treated by ultraconservative treatment modality of air abrasion. (n=50)

Preoperative radiograph was taken as a baseline.

Group A - Cavity preparation was done using high speed conventional rotary instrumentation. Residual caries was detected using caries detection dye. Extent, depth of cavity preparation was noted. Teeth were restored with posterior composite/flowable composite depending on the depth of cavity.

Group B - Cavity preparation was done with air abrasion unit. Settings were 60 psi-80 psi, with 27-micron particles. Flow of water was adjusted so that it just curtains the alumina particles. Tip of air abrasion hand piece was 0.014 inch and was kept at an angle of 45-60 degree, 1 mm away from the tooth surface. Movements were short controlled bursts, designed to trace out and identify the pits and fissures and caries while following path of least resistance. High volume suction was used to control and remove the particle debris. For removal of residual caries, pressure settings were reduced to lower setting. Restoration was done as in Group A. After finishing and polishing occlusion was checked.

For each modality the patient was asked to rate their pain according to Visual analogue scale (VAS) and fill a technique preference questionnaire. Time taken for completion of respective protocol was noted. Follow up at 3, 6, 9 and 12 months interval included Cvar and Ryge criteria for clinical evaluation of restoration, followed by a radiological evaluation. Radiological evaluation included preoperative evaluation of depth of carious lesion, depth post restoration and secondary caries if any. Clinical evaluation included: colour match, cavosurface margin discoloration, anatomic form, marginal adaptation and caries.

Statistical analysis was done by student ‘t’ test to determine statistical difference between expired and survived in the parameters measured, Wilcoxon test for evaluating median survival time and Chi square test of significance for proportion analysis.

**RESULTS**

**Graph 1**: Average time taken for preparation was lesser in Group B with a mean of 3.3426 minutes as compared to 11.2593 min of Group A. VAS rating indicates that Air abrasion protocol elicited lesser pain. Ekstrand clinical criteria showed that preoperatively the lesions were similar in size.

**Preferred modality**

Graph 2: Air abrasion was the preferred modality in 85 percent of the patients.
Caries lesion was confined to outer half of enamel (E1) in 1 case in Group B, inner half of enamel (E2) in 35 cases in both groups, 18 cases in Group A had caries extending to outer third of dentin (D1), 1 case had caries extending till middle third of dentin (D2). In Group B 19 cases were extending till D1 zone. (Graph 3)

Graph 3: Preoperative radiographic evaluation of extent of cavity

The preoperative score for Group A was E1-0, E2-35, D1-18, and D2-1; postoperatively it had become E2-0, D1-27, and D2-27. The preoperative score for Group B was E1-1, E2-35, D1-19, D2-0, postoperatively it had becomeE1-1, E2-20, D1-33, and D2-1. Thereby indicating that cavity preparation was more in extent and depth for Group A as compared to Group B.

The radiographic preoperative score for both groups was similar but postoperatively, the cavity preparation was more in extent and depth for Group A as compared to Group B. (Graph 3 and Graph 4)

Graph 4: Postoperative radiographic evaluation of extent of cavity

Table 1: At 12 months, clinically there were 10 patients who showed color mismatch and cavosurface marginal discolouration as compared to 1 in Group B but the defect did not penetrate towards pulp in Group B. The anatomic form was under contoured at follow-up in 6 patients in Group A as compared to 1 in Group B. Marginal adaptation was grossly lost in 5 patients in Group B, but only minimally lost in 1 patient in Group B. Secondary caries was clinically detected and verified.
radiographically in 5 patients of Group A, as compared to nil in Group B. In Toto, the Group A showed 5 biological failures and 05 mechanical failures which required replacement, and nil in Group B.

**DISCUSSION**

Introduction of new concepts in adhesion has significantly changed the perception of G. V Black’s principles and classification of carious lesion. Classification proposed by Mount and Hume based on site and size of carious lesion lays the foundation for selection of the cavity design and restorative material. It was used in the study as it aided in deciding the restorative option based on diagnosis.

Microdentist relies on three essential tools when using air abrasion: magnification and visualization which is enhanced by use of loupes,\(^1\) caries-detection dye,\(^9,10\) is used in diagnostic, intraoperative as well as postoperative phase to detect any residual caries thus making the cavity preparation very conservative in both groups. Third, is an air-abrasion unit whose parameters are adjustable.\(^1,9,11\)

Unlike rotary cutting instruments; the principle action of air-abrasion is end cutting and works linearly on kinetic energy and results in rounded line angles thus reducing stress concentration.\(^1,3,11\) In this study, it was clinically found and confirmed radiographically that the depth of preparation is less (Fig 1, 2) internal line angles and point angles are more rounded in Group B as compared to Group A.

In the present study the site 1 size 1 lesions were selected and scored with Ekstrand criteria for pit and fissure clinical severity index. Initial lesion being similar in size and site within each patient, helps to assess which modality selectively identifies and removes only unsound tooth structure and preserves the natural structural integrity. Cases were radiographically evaluated and lesion extent in enamel or dentin was noted preoperatively and cavity preparation extent evaluated postoperatively (Fig 1, 2, Graph 3, 4). Cavity preparation in Group A
was deeper and wider and deeply in dentin whereas in Group B the preparation extended into enamel or outer third of dentin. (Graph 3) Secondary caries was detected in this study at 9, 12 months in Group A both clinically and radiologically and warranted retreatment.

In 1950’s the concept of high volume evacuation was not introduced this led to challenges in evacuating the used sand particles, hence air abrasion despite its initial popularity faded into ignominy. Scannavino et al proved that the high volume suction reduces the risk for the operator and dental staff of inhaling both aluminium oxide particles and bacteria originated from the patient’s mouth. The air abrasion unit in our study has a vent for water so that it has concentric nozzle arrangement, with water acting as a curtain to restrain powder scatter by using the Venturi effect derived from the powder-air stream.

Air abrasion units are available with a number of variables and each having its clinical impact. Various studies clinically correlate these variables with the efficacy of the procedure. In this study we have used powder of 27 microns, the pressure settings are 80 psi to begin with, this is reduced to 60 psi when the residual caries is being removed.

VAS is a measurement that tries to measure a characteristic or attitude that ranges across a continuum of values and cannot be directly measured. VAS of pain is a reliable, internally consistent, relatively sensitive measure of clinical and experimental pain sensation and intensity. In our study by using VAS, it was confirmed that Group B elicited less amount of pain or unpleasantness. In 85.2 % of patients, the preferred modality of treatment was air abrasion. Further the time taken to complete cavity preparation was less in Group B. The advantage of using the study and the control within same patient helps in evaluating which modality is more painless, faster and more acceptable to the patient without inherent bias. (Graph 1, 2)

World Dental Federation Study Design for Clinical Trials and Criteria for Evaluation (Direct and Indirect Restorations) recommends use of Cvar and Ryge criteria for clinical evaluation and comparison of the restorations. Applying this criterion, it was found that there is a statistical significant difference in both Groups, in each variable being evaluated i.e. at 6 months onwards there was a statistically significant change in colour match, cavosurface marginal discoloration, marginal adaptation, presence of secondary caries, which finally led to restorations being replaced in 5 patients in Group A. This is further confirmed by analyzing with statistical tool of Wilcoxon Ranked Signed Test, which has reiterated the clinically findings, that there is a significant deterioration of the analyzed variables with time. (Table 1)

Owing to the limitations of this study design, the other advantages of air abrasion over conventional method of cavity preparation, like increase in bond strength and increasing the potentiality of remineralization of remaining tooth structure and using air abrasion as an adjunct in diagnosis of questionable lesion. However, it can be inferred that Group B has exhibited a better clinical performance than Group A. A long-term evaluation of both the groups is required in order to assess the survival probability.

**CONCLUSION**

Cavities produced are shallower, narrower with rounded line and point angles thereby reducing stress concentration in air abrasion group as compared to conventional method tested on the contralateral tooth type. Thus, conserving tooth structure, increasing strength and longevity of restoration.

Group A had 5 biological failures and 5 mechanical failures which required replacement, whereas there were no biological failures or mechanical failures in Group B.

Air abrasion is the preferred treatment modality of the patients. It reduces chairside time, causes less pain, allays fear, reduces vibration, and obviates need of anaesthesia.

In the light of the limitations of this study design, air abrasion system shows promising results and appears to be a better alternative to conventional method of cavity preparation. However, long-term clinical trials are required to authenticate this conclusion.

**Ethical Clearance:** Taken from Military Hospital Golconda.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**

1. Rainey J T. Air abrasion: an emerging standard of


Diabetes Mellitus Type 2 - A Predictor of Metabolic Syndrome in Urban Population of North India

Manoj Kumar Sharma¹, Sonali Pandey², Suryakant Nagtilak³

¹Research Scholar, ²Associate Professor, Department School of Sciences, JECRC University, Jaipur, Rajasthan, India, ³Prof. & Head, Department of Biochemistry, Sridev Suman Subharti Medical College Dehradun, Uttarakhand, India

ABSTRACT

The Metabolic syndrome (MetS) referred as a cluster of hypertension, hyperglycemia, dyslipidemia, and central obesity. The type 2 Diabetes Mellitus (T2DM) may be useful as a practical tool to predict the metabolic disorder. Now a day’s incidence of MetS is increasing in urban population. However, the present study focused on the role played of T2DM as a risk factor for development of MetS.

Aim: To study the incidence of T2DM and role played by with it as a predictor of MetS in an urban population of Greater Noida.

Material and Method: A total of 183 participants recruited in the present study in the age group of 20-55 years of age both male and female. The patients were diagnosed for MetS according to the National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III) criteria for associated risk factors of MetS in urban population. The data were analyzed by using SPSS-16 software.

Results: The total incidence of T2DM in an urban population of Greater Noida is 21.3% with a high incidence among female, 23.6% as compared with male, 18.8%. Overall The MetS as per NCEP/ATP III criteria was 24.7%, with a higher risk among female, 27.8% compared with male, 21.7% respectively. Urban T2DM patients showed statistically significant (p<0.05) high risk of abdominal obesity, hypertension and triglyceridemia.

Conclusion: Risk factors of T2DM and MetS is useful, to identify overweight, obesity and dyslipidemia. T2DM patients having a longer duration may adopt the risk of the Mets. Study highlights the risk of MetS increases with the advancement of age in both male and female. T2DM is increasing at rampant in Urban population due to changes in lifestyle and genetic factors. Routine monitoring and screening programs of T2DM components are required for early detection of MetS in the study population.

Keywords: Metabolic syndrome, Obesity, Polypegia, Triglyceridemia, Cardiovascular disease

INTRODUCTION

T2DM is currently leading cause of mortality worldwide and together with risk factors of MetS.¹ It is very important to investigate a newly detected cases of T2DM for signs of the MetS so that complications may be prevented.² At least 65% of patients having T2DM with the associated with risk factors die of some form of dyslipidemia or metabolic disorder. The classic symptoms of untreated T2DM are loss of weight, polyuria, polydipsia, and polyphagia.³ T2DM is associated with an obese, regardless of age, race, and gender.⁴ Many studies have reported the strong association of waist circumference (WC) with risk of metabolic disease.⁵,⁶ It’s said that India capital of diabetic patients than any other country in the world. According to the international diabetes foundation, the
disease affects more than 50 million adults and kills about 1 million Indians a year. MetS requires 3 of the following 5 factors to have a diagnosis, increased WC, elevated triglycerides, reduced high density lipoprotein-cholesterol (HDL-C), elevated blood pressure (BP) and elevated fasting blood glucose (FBG) respectively. The incidence of central obesity and MetS is rapidly increasing in India and other countries, leading to increased mortality and morbidity due to cardiovascular disease (CVD) and T2DM. Risk factors of MetS and central obesity track into advanced age, these clinical entities need to be detected early in the life course for prevention and effective control of T2DM. An early and quick assessment of MetS and T2DM may help to improve the stratification risk of disease and also help in planning, intervention and prevention strategies in an effective manner. Furthermore, the frequency of noncommunicable diseases in India continues to rise in recent years, they particularly affect the advancement of age of female patients. There is no report studying MetS and T2DM association in an urban population of Greater Noida. The aim of present study is to evaluate the incidence of T2DM, as a predictor of MetS in an urban population of Greater Noida.

**MATERIALS AND METHOD**

The present study was conducted in tertiary care centres (multicentric hospital based study) in Greater Noida, Gautam Budha Nagar District in Uttar Pradesh. Comprising of 183 participants, 141 patients (69 M, 72 F) and 42 controls (21 M, 21 F) with healthy age and sex matched, between 20 to 55 years of age duration from Feb, 2014 to Jan, 2016. Patients with a past history of stroke, coronary artery disease (CAD), and diabetes mellitus were excluded from the study. Data’s were collected using pre-tested proforma formulated according to the NCEP ATPIII criteria for Indian population. The patients were subjected to detailed anthropometric measurements and clinical examination, including body mass index (BMI) (weight in kg/height in m2). The height was measured by using wall mounted stadiometer. Body weight was measured by using a calibrated weight machine. WC and hip circumference was measured by using standard procedures. Systolic BP (SBP) and diastolic BP (DBP) was measured in sitting position after a rest of 15 min. Blood samples (venous) were collected in the morning after an overnight fasting (8-10 hrs) from the participants. Plasma blood glucose was measured by using glucose oxidase-peroxidase (GOD-POD) method. Triglyceride was estimated by the glycerophosphate-oxidase (GPO/PAP) method. HDL-C in fasting serum sample quantitated by following the precipitation/enzymatic method. HbA1c was processed by fluorescence immunoassay based method. Where all biochemical concentrations expressed in mg/dl. Diabetes mellitus was defined if FBG ≥ 110 mg/dl (fasting for at least 8-10 hours) or 2 hours postprandial (PPBG) ≥ 140 mg/dl (venous blood) or HbA1c > 6.5%.

According to the NCEP, ATP III criteria in 2001 (National Cholesterol Education Program JAMA, 2001) for a person to be defined as having the MetS must have a combination of any three or more of the following five risk factors:

1. Waist circumference >102 cm male and >88 cm in female
2. Serum triglycerides ≥150 mg/dl
3. HDL cholesterol <40mg/dl male and <50mg/dl female
4. Blood pressure ≥130/85 mm Hg
5. FBG ≥110 mg/dl

**STATISTICAL ANALYSIS**

The data analysis of participants were presented as mean±SD. The data were compared by using student’s “t” test. In all the statistical calculations p<0.05 was regarded as a significant. The data were analyzed by using Statistical Package for Social Survey (SPSS) for windows 16.0 software (SPSS Inc., Chicago, IL, USA).

**RESULTS**

There were 183 participants recruited in the urban study area. In the control group, there were 42 healthy participants were without any risk factors of T2DM and MetS with the mean age 35.95±8.44 years of male and 37.76±10.97 years of female ranging from 21 years to 53 years. In control group there were mean ± SD within normal limits. In patient group, there were 141 participants with unknown T2DM and risk factors of MetS with the mean age of 43.65±8.68 years of male and 42.66±9.34 years of female ranging from 24 years to 55 years. The anthropometric as well as clinical details of participants were listed and compared in [Table-1].
Table-1: Anthropometric and biochemical mean value of MetS and T2DM risk factors among study population. Data expressed as mean ± SD.  p<0.05 significant.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N=42 (control group)</th>
<th>N=141 (patient group)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (n=21) Mean ± SD</td>
<td>Female (n=21) Mean ± SD</td>
</tr>
<tr>
<td>Anthropometric Measurements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age in years</td>
<td>35.95±8.44</td>
<td>37.76±10.97</td>
</tr>
<tr>
<td>BMI kg/m²</td>
<td>23.29±0.89</td>
<td>23.23±1.29</td>
</tr>
<tr>
<td>B.P (systolic) mm Hg</td>
<td>127.52±2.69</td>
<td>125.57±3.26</td>
</tr>
<tr>
<td>B.P (Diastolic) mm Hg</td>
<td>82.14±2.22</td>
<td>81.81±2.06</td>
</tr>
<tr>
<td>Waist circumference cms</td>
<td>80.00±3.97</td>
<td>81.43±5.20</td>
</tr>
<tr>
<td>Biochemical Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBG mg/dl</td>
<td>86.72±17.31</td>
<td>88.36±8.24</td>
</tr>
<tr>
<td>PPBG mg/dl</td>
<td>118.6±8.31</td>
<td>119.89±13.87</td>
</tr>
<tr>
<td>Triglycerides mg/dl</td>
<td>139.93±5.71</td>
<td>131.21±17.42</td>
</tr>
<tr>
<td>HDL –C mg/dl</td>
<td>50.00±5.10</td>
<td>54.94±2.97</td>
</tr>
<tr>
<td>HbA1c %</td>
<td>4.64±0.32</td>
<td>4.55±0.58</td>
</tr>
</tbody>
</table>

There were statistically significant difference in mean levels of systolic blood pressure, waist circumference and lower levels of HDL-C (p<0.05). The mean level of age, BMI, DBP, FBG, PPBG, triglycerides and HbA1c were statistically insignificant (p>0.05) [Table-1].

Table-2 Incidence of associated risk factors of MetS.

<table>
<thead>
<tr>
<th>Characteristic of Mets</th>
<th>Male, n (%)</th>
<th>Female, n (%)</th>
<th>Total, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>17 (24.6)</td>
<td>18 (25.0)</td>
<td>35 (24.8)</td>
</tr>
<tr>
<td>Central Obesity</td>
<td>13 (18.8)</td>
<td>21 (29.2)</td>
<td>34 (24.1)</td>
</tr>
<tr>
<td>Hyperglycemia</td>
<td>20 (29.0)</td>
<td>21 (29.2)</td>
<td>41 (29.0)</td>
</tr>
<tr>
<td>Triglyceridemia</td>
<td>26 (37.7)</td>
<td>21 (29.2)</td>
<td>47 (33.3)</td>
</tr>
<tr>
<td>Low HDL-C</td>
<td>18 (26.0)</td>
<td>21 (29.2)</td>
<td>39 (27.6)</td>
</tr>
<tr>
<td>T2DM</td>
<td>13 (18.8)</td>
<td>17 (23.6)</td>
<td>30 (21.3)</td>
</tr>
<tr>
<td>MetS</td>
<td>15 (21.7)</td>
<td>20 (27.8)</td>
<td>35 (24.7)</td>
</tr>
</tbody>
</table>

**Incidence of risk factors:**

Total 48.9% of the study, patients were males, and 51.1% were females. The incidence of hypertension, central obesity, hyperglycemia and low levels of HDL-C were higher in females as compared to male counterparts. Whereas triglyceride levels were higher in males as compared to females [Table-2]. Both SBP and DBP were elevated in MetS patients, but DBP elevation was more commonly seen in the study population. Low levels of HDL-C and elevated triglycerides were seen to be associated with most cases of MetS. Low levels of HDL-C was seen more commonly in female as compared to males, whereas triglyceridemia was more common in male.

The total incidence of MetS and T2DM among 141 study, patients were found 24.7% and 21.3%
respectively. The incidence of MetS and T2DM was more among female 27.8% and 23.6% as compared to male counterparts 21.7% and 18.8% respectively [Table-2].

Table-3: Age specific and age standardize incidence of MetS and gender wise T2DM

<table>
<thead>
<tr>
<th>Age Group in Years</th>
<th>Male, n (%)</th>
<th>Female, n (%)</th>
<th>Incidence of MetS and T2DM in male, n (%)</th>
<th>Incidence of MetS and T2DM in female, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>MetS</td>
<td>T2DM</td>
</tr>
<tr>
<td>20-30</td>
<td>8 (11.6)</td>
<td>11 (15.3)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>31-40</td>
<td>14 (20.3)</td>
<td>19 (26.4)</td>
<td>4 (28.6)</td>
<td>3 (21.4)</td>
</tr>
<tr>
<td>41-50</td>
<td>26 (37.7)</td>
<td>21 (29.2)</td>
<td>5 (19.2)</td>
<td>5 (19.2)</td>
</tr>
<tr>
<td>&gt;50</td>
<td>21 (30.4)</td>
<td>21 (29.2)</td>
<td>6 (28.6)</td>
<td>5 (23.8)</td>
</tr>
</tbody>
</table>

Table-3 shows the risk of MetS and T2DM was found increased with the advancing of age in both male and female in the urban study area. After forty years of age people have symptoms of MetS and T2DM. Older age like >50 years, both male and female have a higher risk of MetS and T2DM. Female at the age of >50 years were higher risk of MetS and T2DM than male counterparts.

DISCUSSION

The present study reports incidence of the T2DM, MetS and its risk factors in urban study patients. The most common endocrine disease like diabetes significantly increases the risk for MetS and its risk factors. T2DM is also associated with increased endothelial dysfunction, depletion of endothelial progenitor cells and arterial stiffness all of which may predispose to elevated the metabolic disease. A higher trend of MetS in females (27.8%) as compared to males (21.7%) in the present study was found which supported by Magnat et al. Lipid indicators and diabetes have been shown to be the important predictors for metabolic disturbances, including hypertension, dyslipidemia and CVD. Age should be taken into consideration when using HbA1c for control and management of T2DM. The incidence of MetS was found highest in the advancing of age group of >50 years with 33.3%, based on criteria of ATP III, and Yadav D, et.al. also reported similar pattern. The studies also reported that the number of risk factors associated with the risk of T2DM and MetS. Low HDL-C in male and females were frequently seen 26.0% and 29.2% respectively. In the present study, it was also found during gender comparisons that low HDL-C was significantly more in female than male, A total 33.3% of the cases also had triglyceridemia in urban population. Studies conducted by Supriya et al, supported the observation, whereas hypertriglyceridemia was more common in male as compared to female. The highest incidence of hypertension 24.8%, followed by hyperglycemia 29.0% and central obesity (24.1%) was observed in the current study. Similarly, Sidorenkov et al. found hypertension as the most frequent element in both male and female, followed by central obesity and hyperglycemia by using NCEP ATP III guidelines. Furthermore, Rodriguez et al. low HDL-C and elevated triglycerides were seen to be associated with most cases of MetS. The early detection of these diseases will be very useful for prevention, intervention and in the clinical management of the disease. Hence, several studies have focused on the prediction of metabolic disease among diabetic patients. The T2DM may be used as a predictor of MetS. Screening programs and routine monitoring of MetS components are necessary for detecting the T2DM, in addition to being supported by changes in dietary pattern, lifestyle, and increased physical activity.

CONCLUSION

The present study concludes that, public awareness has to be created about MetS and T2DM patients for regular health check up of well-known risk factors. The incidence of MetS and T2DM increases with the advancement of age and it is more common in female as compared to male counterparts. T2DM significantly increases the risk for MetS. Patients have to be encouraged on changes of lifestyle to prevent and the intervention of T2DM and risk factors of MetS. Diabetic patients with central obesity and hypertension have a
high association with MetS. Sedentary lifestyle definitely plays a very important role in the development of MetS. High incidence of MetS and T2DM may also be due to change of lifestyle, lack of awareness and physical activity in the study population.

**Ethical Clearance** - Taken from the ethics committee of the institution.

**Source of Funding** - Self

**Conflict of Interest** - Nil

**REFERENCES**


The Impacts of Goods and Servies Tax (GST) on Middle Income Earners in India

Ch. Bala Nageswara Rao¹, B Neeraja²

¹Director, ²Assistant Professor, Saveetha School of Management, Saveetha University, Chennai

ABSTRACT

This paper is an analysis of goods and service tax and its impact on business environment in India. The one and only indirect tax which affects all the sections and sectors of our economy is GST. In this new taxation regime, goods and services are considered equally for the taxation process. It is aimed at creating single, unified market which benefits economy, corporate and individuals. Several countries have implemented this GST followed by France, the first country to introduce this taxation system. It creates commonality of taxing policy between states. Author has started this article with intro on GST, some backgrounds, and tried to highlight the objectives, challenges and threats, opportunities for the development of Indian economy and the overall impacts GST on middle income earners in India. Even GST is good the consumers are worrying of the significant price increase on the basic needs. It has become great burden for the middle income earners. Therefore the main objectives of the study is; First, to analyse the consumer readiness, perceptions, attitude, and acceptance of GST. Second, to analyse the buying behaviour of the middle income group people. Data is collected through structured survey among middle income earners. From various organisations including private and public sectors from various locations, the respondents were chosen randomly. This study reveals some facts to the relevant government authorities so that they could develop some strategies to reduce the financial burden of middle income earners.

Keywords: Input credit, Cascading Effect, consumer buying behaviour. GST, CGST, SGST, VAT,

INTRODUCTION

The GST is fundamentally an indirect tax which subsumes most of the taxes imposed on most goods and services, on manufacture, sale and consumption of goods and services, under a single domain at the national level. At present, taxes are levied separately on goods and services. The GST is a consolidated tax based on a unified rate of tax fixed for both goods and services. It is payable at the final point of consumption so we can call it as destination based tax. At each stage of sale or purchase in the supply chain, GST is levied on value-added goods and services; through an input tax credit system. Dual GST model is implemented in India where GST is divided into two parts:

State Goods and Services Tax (SGST)

Central Goods and Services Tax (CGST)

Both SGST and CGST will be levied on the taxable value of a transaction. Only few goods and services are excluded in this new regime and there is no difference between goods and services under this system. The GST system subsumes Central excise duty, additional excise duty, services tax, State VAT, entertainment tax etc. under one banner.

BACKGROUND OF INDIRECT TAXATION SYSTEM:

- In 1974 LK Jha Committee presented a report on VAT.
- In 1986 restricted VAT called MODVAT is introduced.
- In 1991 the committee formed by Chelliah recommends VAT/GST and those recommendations are accepted by government.
- In 1994 Service Tax was introduced.
- In 1999 Empowered Committee on State VAT was formed.
• In 2000 uniformed floor Sales tax rate is implemented and states had granted abolition of tax related incentives.

• VAT was implemented in Haryana in April 2003

• In 2004 progress towards CENVAT was done+

• In 2005-2006 VAT was implemented in more than 26 states.

• In 2007 First GST stuff was released By Mr. P. Shome and finance minister Announces for GST in budget Speech

• 2007 CST phase out

• In April 2007 CST phase out was started and joint working group was formed after that report was submitted.

• In April, 2008, a report is submitted by EC, titled “A Model and Road map for Goods and Services Tax (GST) in India”.

• Finally, our government of India officially introduced a national Goods and Services Tax in India from 1 July 2017 through 101\textsuperscript{a} Amendment Act, 2016.

\textbf{POSITIVE IMPACTS OF GST:}\textsuperscript{2}

As per industry experts, Small scale industries and newly start-ups will get affected the most with the introduction of the GST and the impact will be positive in many ways. Some of the ways GST that encourages most of the sectors and start-ups are:

• \textbf{Starting business is made easy:} VAT registration is required for the businesses having operations across different states. People face complication due to different tax rules in different states and incur large procedural fees. Through this GST a centralised registration process has been formed so the people can start business easier than before.

• \textbf{Tax burden is reduced in new start-ups:} In the old tax structure methodology, enterprises with more than rupee 5 lakh turnover we need to pay VAT registration fee. But now the government mulls the exemption limit to 20 lakhs giving advantage of over 60% of small traders and readers.

• \textbf{Services are delivered at faster rate and logistics is improved:} Under the present GST system, entry tax is not levied for goods manufactured or sold in any part of India. So that the delivery of goods at interstate points and toll gates will be expedited. According to an estimation made by CRISIL agency, the logistics and other supply chain cost for manufacturers of bulk goods will be reduced significantly—by about 20%. This is will boost ecommerce across the nation.

• \textbf{Distinction between goods and services is get eliminated:} GST reduces ambivalence between goods and services. Various legal proceedings related to the packaged products are made simple. Finally, there will no longer be a differences between the material and the service component, which will greatly reduce tax evasion.

• \textbf{Cascading effect of tax is solved:}\textsuperscript{1}

We pay tax only for the expenses we made each time in the supply chain and the input tax is credited to our account. Economic growth will also rise. GST will push up economic growth.

• It reduces average tax burden

• GST reduces corruption and helps in the development of Indian economy.

\textbf{NEGATIVE IMPACTS OF GST:}\textsuperscript{2}

Small companies get affected when compared with large companies since companies with turnover of less than 20 lakh rupees will not pay GST and follow the old taxation structure of paying excise duty, value added tax etc.

Sometimes the unorganised small sectors may lose some of its competitive edge at the initial stage which means there might be pressures for the layoffs in the companies so that they could not compete as a result of GST implementation.\textsuperscript{3}

There should be strong information technology network in order to file GST because small firms face lot of problems in following technology.

We are in India following dual GST model. It becomes tough for the centre to cope up with states.
SUBSUMED TAXES UNDER GST:

- Sales tax/VAT
- State tax
- Entertainment tax
- Taxes on lottery, betting and gambling
- Luxury tax
- Entry tax
- Purchase tax
- Central excise duty
- Additional excise duty
- Service tax
- Additional customs duty
- Surcharges
- Cesses

OBJECTIVES OF THE STUDY:

- To analyse the middle income consumer readiness, perceptions, attitude, and acceptance of GST.
- To analyse the buying behaviour of the middle income group people.

REVIEW OF LITERATURE

Desai and Hines (2005) studied the impact of GST on international trade and cross border shopping. This made the analysis that the extent of buying and selling behaviour had reliance upon it.

Kavitha Rao and Pinaki Chakraborty (2010) assessed the most contentious issue raised because of unlikely rates at which the new regime is implemented. This affected the buying nature of low and middle income people due to non-feasible rates.

Hong Yong Hoe (2015) et.al compared purchase intention before and after the implementation of the GST. Almost 100 sellers were interviewed in five major shopping centres and the final result showed that the most of the customers are likely to purchase goods before GST but unlikely to purchase after GST.

Kim – Hwa & Qi (2013) proposed that GST is an regressive tax. The tax is imposed lower income earners than higher income earner.

Zhou et al. (2013) found that the more benefit goes to rich because they save more and spend less while the lower income groups have marginal propensity to consume. Therefore, low income households are sensitive to fluctuations in commodity related revenue.

Palil & Ibrahim (2011) reported that low income households are worried about GST implementation. The empirical study by UOB Global Economies & Market Research compared the impact of GST in many countries such as Singapore, Japan, Thailand, and India and found that GST has a short term impact on CPI. The new tax regime increases the CPI and inflation rates revert to long term averages in the years after implementation.

Lai and Choong (2006) studied the same finding as previous studies whereby the majority of contributors in their study felt that the GST will disturb the prices of goods and services as well as the upsurge in wages. Results study designate that more than half of the respondents expected the GST will affect the expenses habit and observed that they would spend less and maintain their outlay and saving amount after implementation of GST.

RESEARCH METHODOLOGY

Data was collected through structured survey among middle income earners. The proposed monthly income threshold is between Rs.10000 to Rs. 20000. The respondents were selected from both private and public sectors and the focus is given to big city as it represents the behaviour of entire population. This survey signifies defendants’ acceptance, readiness and their conduct in response to the introduction of GST; enumerators are needed to obtain responses. The survey instrument was divided into two main sections. The first section comprised of demographic variables comprising gender, age, monthly income and their governmental associations. The succeeding section comprised of four sub sections which shield queries linked to respondents’ readiness, acceptance, perceptions and their buying behaviour towards GST. For the purpose of this study, 39 respondents were analysed to answer the research questions and objective of this paper. The next section will discuss the results of this study by outlining the descriptive evidence of respondents as well as comparing means through t-test and one-way ANOVA.

RESULTS

The outcomes of this study are distributed into four sections which arise with respondents’ circumstantial
followed by respondents’ readiness, acceptance and Perceptions. Respondents’ behaviour towards the execution of GST and further analysis to describe the relationship between the demographics credentials and variables tested are also conferred in the later part of this section

**Respondent’s backgrounds**

The respondents embraced of 26 females, 13 males, 27 respondents were aged less than 30 years old, 11 respondents were between 31 – 40 years old while only one respondent aged more than 40 years old. The dispersal of respondents are similarly likely for the datum that 20 respondents are occupied in government sector while another half (19 respondents) are tangled in private sector. On their monthly income, the majority of the respondents (26 respondents) are earned between Rs. 10000 and Rs. 20000

**Readiness, perceptions and acceptance of GST**

The reading proposed that the majority of respondents (65%) were not fulfilled with the facts delivered by the government concerning to the introduction of GST. In accumulation, 64% of the respondents also not prepared to back the government when GST is fulfilled. On the other hand, the majority of the respondents are imperfectly informed and are not very happy with GST, almost half of the respondents are mindful that the government will impose the GST. In divergence, average 54% of respondents are set with the implementation of GST. Further study discovered that though half of the respondents were prepared, conversely, 72% of the respondents are nervous that the GST will raise the prices of the products in near future, 81% of respondents were also supposed that incarate costs would also rise considerably when GST is implemented. On the other hand, 43% of the respondents were enduring uncertain and not sure what would happen after GST. On run-of-the-mill, 67% of the respondents observed that GST would upsurge living cost. The stages of recognition of GST among respondents were also low evinced by 30% of the respondents were upset with the implementation of GST. Moreover, only 12% of the respondents could accept GST as they supposed that GST would lessen their living costs. On top of that as they are aware that the implementation of GST is beyond their control, therefore this study suggested that 39% of respondents have to accept GST and have to reschedule their consumptions behaviour to conform to the impact of GST.

**Potential impacts on consumptions behaviour**

This reading recommended that 51.3% of the respondents were not distresses their consumptions behaviour even though they supposed that the GST would increase the goods prices. 64.1% of the respondents will still buy the goods but with careful considerations while 64.1% will lessen their consumptions in line with their income. Only 20% of the respondents were likely to upsurge their ingestions behaviour after GST is implemented.

**Further Analysis**

The majority of the respondents were considered dissatisfied after implementation of GST so there is increase in prices of goods and finally increase their living costs particularly in big Cities. Conferring to Table 1, the T-test proven that there is no major gender differences for all variable tested (readiness (t =25.479), perceptions (t =39.833), acceptance (t = 45.328) and behaviour (t = 46.542)) which mean that male and female were having cold opinion upon these variables.

**Table 1 – Independent samples T-test between gender and readiness, Perceptions and acceptance of GST**

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Mean Difference</th>
<th>Standard Error Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>READY</td>
<td>25.479</td>
<td>39</td>
<td>3.29635</td>
<td>.22850</td>
</tr>
<tr>
<td>PERCEPT</td>
<td>39.833</td>
<td>39</td>
<td>3.43735</td>
<td>.16349</td>
</tr>
<tr>
<td>ACCEPT</td>
<td>45.328</td>
<td>39</td>
<td>3.25496</td>
<td>.12333</td>
</tr>
<tr>
<td>BEHAVIOUR</td>
<td>46.542</td>
<td>39</td>
<td>3.22223</td>
<td>.12212</td>
</tr>
</tbody>
</table>

Conferring to Table 2, the t-test also discovered that there is no significant political connection differences, for all variable tested (readiness (t =.702), perceptions (t =2.395), acceptance (t = .983) and behaviour (t = 2.100) which mean that regardless of their affiliation. They have uninterested opinions which mean that whatever their political affiliations are, they are not happy if goods prices were increase when GST is implemented.
Table 2 – Independent samples T-test between political affiliations and Readiness, perceptions and acceptance of GST

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>READY</td>
<td>.702</td>
<td>14</td>
<td>.30630</td>
<td>.41488</td>
</tr>
<tr>
<td>PERCEPT</td>
<td>2.395</td>
<td>14</td>
<td>.45444</td>
<td>.32850</td>
</tr>
<tr>
<td>ACCEPT</td>
<td>.983</td>
<td>14</td>
<td>.14335</td>
<td>.15249</td>
</tr>
<tr>
<td>BEHAVIOUR</td>
<td>2.100</td>
<td>14</td>
<td>.33233</td>
<td>.12021</td>
</tr>
</tbody>
</table>

The one-way analysis of variance (ANOVA) as shown in Table 3 also advised that there is no significant variances among respondents’ age for all variable tested, apart from behaviour (readiness (F = 2.162), perceptions (F = 1.129), acceptance (F = 1.832) and behaviour (F = 2.422) which means that irrespective of how old the respondents are, they have related thoughts and consumptions behaviour towards the execution of GST.

Table 3 – One-way analysis of variance (ANOVA) among respondents age and readiness, perceptions and acceptance of GST

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>READY</td>
<td>Between</td>
<td>4.834</td>
<td>4</td>
<td>1.133</td>
</tr>
<tr>
<td>READY</td>
<td>Groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>READY</td>
<td>Within Groups</td>
<td>20.337</td>
<td>34</td>
<td>.597</td>
</tr>
<tr>
<td>READY</td>
<td>Total</td>
<td>25.171</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>PERCEPT</td>
<td>Between</td>
<td>1.146</td>
<td>4</td>
<td>.311</td>
</tr>
<tr>
<td>PERCEPT</td>
<td>Groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERCEPT</td>
<td>Within Groups</td>
<td>10.198</td>
<td>34</td>
<td>.303</td>
</tr>
<tr>
<td>PERCEPT</td>
<td>Total</td>
<td>11.444</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>ACCEPT</td>
<td>Between</td>
<td>1.261</td>
<td>4</td>
<td>.341</td>
</tr>
<tr>
<td>ACCEPT</td>
<td>Groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCEPT</td>
<td>Within Groups</td>
<td>6.579</td>
<td>34</td>
<td>.195</td>
</tr>
<tr>
<td>ACCEPT</td>
<td>Total</td>
<td>8.140</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>BEHAVIOUR</td>
<td>Between</td>
<td>2.512</td>
<td>4</td>
<td>.654</td>
</tr>
<tr>
<td>BEHAVIOUR</td>
<td>Groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEHAVIOUR</td>
<td>Within Groups</td>
<td>5.990</td>
<td>34</td>
<td>.176</td>
</tr>
<tr>
<td>BEHAVIOUR</td>
<td>Total</td>
<td>8.604</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSION

This study says that the middle and low income earners are totally affected and worried about purchasing power due to implementation of GST. The study reveals that the respondents got very few data and promotional activities should be made from the authorities to the people. Positive and negative impacts they are facing as of now. Secondly, people are having mind-set that the price will get increased. The government should take alternate plans to reduce the burden of low and middle income earners. Thirdly, as this reading proposed that people’s consumptions behaviour would transform meaningfully due to the implementation of GST, it is believed that respondents would be more judiciousness and choosy in their purchasing behaviour. This would possibly change
the economic growth principally on aggregate demand. Observing at other developed nations such as United Kingdom (17.5%) and New Zealand (12.5% - 15%), the outlines of GST has enhanced their tax revenues and proficiency provided that India received a substantial support and collaboration from all parties not only from business entities but also from consumers like us.

Thus GST will transform the entire Indian economy into transparent and brings the concept of one country one nation. It forges single economic zone throughout the country from overlapping federal and state tax. GST is in stroke with Supportive Federalism wherein the centre and the states graft together for the nations benefit. In the longer run, the GST is anticipated to invite foreign investment sinking the cost of capital goods; increase manufacturing and exports, upsurge tax collections and create jobs. It is projected that GST will place a conclusion to “Tax Terrorism”.

Ethical Clearance: Nil

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES
5. R Raj (2017) “Goods and Services Tax in India”
9. www.gstindia.com
The Impact of Scenario Planning on Organizational Sustainability in Healthcare Private Sector

Hamad Karem Hadrawi

Assistant Prof., Faculty of Administration and Economics, University of Kufa, Republic of Iraq

ABSTRACT

The study aims to investigate the impact of scenario planning and its dimensions: environmental analysis, strategic vision, core competency and teamwork on the organizational sustainability in healthcare private sector, in order to achieve this objective we improve a questionnaire based on literatures, the weights of model factors has determined by experts from university of Baghdad and Kufa, a random sample of 125 physicians has been selected and 113 questionnaires were used, data analysis using structural equation modeling, correlation and regression, as a result of this study we established that the utilization of scenario planning with teamwork, environmental analysis and strategic vision is essential and indispensable to achieve organizational Sustainability.

Keywords: Scenario Planning, Environmental Analysis, Strategic Vision, Core, Competency, Teamwork, Organizational Sustainability.

INTRODUCTION

In today’s business world, change is inevitable; the world is rapidly evolving and the resultant change can prove to be nerve-racking. This all streams from the fact that resources are limited and policy may have been miscalculated. For the reason, unless scenario planning is adopted, an organizational sustainability will always remain to be a vanished dream.

In a bid to remain relevant in the corporate world, many firms have gone to consult their figurative crystal balls, form utopian thoughts and visions. These are all deemed to unravel the future and discover the mystery that it holds for them. This is what Ramírez and Cynthia call Scenario planning in there, “Plausibility and probability in scenario planning.” And they pointed out point out that Scenario planning is not the formal forecasting of the future but rather the intuitive approach of considering future possible alternatives that an organization is faced with. Through Scenario planning an organization thinks through its assumptions, avoids future possible inconveniences guaranteeing a perpetual sustainability. Scenario planning is an approach to strategic planning that are likely to affect the functioning of an organization, it therefore, may be defined as a strategy or future plan in uncertain future environment affecting the future decisions that may affect sustainability.

Sustainability in healthcare has become important and complex, required many elements, because the sustainable health service requires the long-term capacity of the organizational system to allocate adequate resources to the activities that meet individual or public health needs. This requires three elements: (i) mission and environment of service (ii) the nature of activity and (iii) the organizational capacity.

Sustainability, hence, is the ability of an organization to continue its operations and achieve its objectives through its three main dimensions, financial, social and operational. It would not be achieved without shared decisions by the healthcare professionals which are crucial.

In this aspects greater attention should be received in order to reach a clearly defined future image which will be difficult without scenario planning.
MATERIAL AND METHOD

This research was conducted in Baghdad city in Iraq among 125 Iraqi physicians, the final number of valid questionnaires was 113 and these were analyzed. The response rate was 93%.

Data were collected using a pre-constructed questionnaire included in its first part items about scenario planning (SP) and its four dimensions (environmental analysis (EA), strategic vision (SV), core competency (CC) and teamwork (TW))\textsuperscript{19}, the second part was about organization’s sustainability (OS)\textsuperscript{20}. To assure validity questionnaire was revised by a panel of experts in addition to Alpha Cronbach testing.

Data analysis and statistical procedures were performed using the statistical package for social sciences (SPSS) V. 23 and AMOS V.18 software the conceptual framework is shown in figure (1) and it follows the standard equation as

\[ OS = \alpha + \beta_1 EA + \beta_2 SV + \beta_3 CC + \beta_4 TW \]

FINDINGS

Confirmatory factor analysis (CFI) of the model used prior to data analysis\textsuperscript{21,22,23} according to the data of sample (Table 1).

The confirmatory factor analyses model of scenario planning consists of four dimensions (EA, SV, CC, TW) with five items in each and the model quality was assured\textsuperscript{24-26}.

Table (1) and Figures 2 and 3 show the result of CFI and SEM analysis as follow: the value of (GFI=0.902), which satisfies the required condition (≥ 0.90), (AGFI=0.887) is close to the acceptance value (> 0.90), (TLI=0.965) is acceptable and the desired value is achieved (≥ 0.95), (RATIO=1.526) is good (<5), furthermore, the root of mean square error result were (RMSEA=0.078) which is accepted (<0.08).

The second measurement model for the organizational sustainability composed of 10 items. The results of goodness of fit of the model were acceptable and close to the required conditions. (Table 1).

Table (1) Goodness of fit result and conditions

<table>
<thead>
<tr>
<th>Goodness of fit indices</th>
<th>Results</th>
<th>Cut Off Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio</td>
<td>1.526</td>
<td>&lt;5</td>
<td>Good</td>
</tr>
<tr>
<td>GFI</td>
<td>0.902</td>
<td>&gt;0.90</td>
<td>Good</td>
</tr>
<tr>
<td>AGFI</td>
<td>0.887</td>
<td>&gt;0.90</td>
<td>Approximately Good</td>
</tr>
<tr>
<td>TLI</td>
<td>0.965</td>
<td>&gt;0.95</td>
<td>Good</td>
</tr>
<tr>
<td>EMSEA</td>
<td>0.078</td>
<td>&lt;0.08</td>
<td>Good</td>
</tr>
<tr>
<td>Ratio</td>
<td>1.012</td>
<td>&lt;5</td>
<td>Good</td>
</tr>
<tr>
<td>GFI</td>
<td>0.970</td>
<td>&gt;0.90</td>
<td>Good</td>
</tr>
<tr>
<td>AGFI</td>
<td>0.923</td>
<td>&gt;0.90</td>
<td>Good</td>
</tr>
<tr>
<td>TLI</td>
<td>0.999</td>
<td>&gt;0.95</td>
<td>Good</td>
</tr>
<tr>
<td>EMSEA</td>
<td>0.011</td>
<td>&lt;0.08</td>
<td>Good</td>
</tr>
</tbody>
</table>

Fig.1 Research conceptual framework

Fig.2 SEM for SP variable
For the sake of the analysis of the relation between the variables correlation and regression were used as described below:

### CORRELATION

Table (2) shows the correlation between scenario planning and its dimensions. There was a significant correlation between scenario planning and organizational sustainability (r = 0.851, P < 0.001) and the correlation is significant based on p-value which is less than 0.05 and the value of T-calculated is significant, where the result of general correlation indicates that the correlation is high, and the dimensions EA, SV, CC, TW indicate there are significant correlation with organizational sustainability with (r1 = 0.653, r2 = 0.661, r3 = 0.559, r4 = 0.720) and all are significant with (p < 0.05).

### REGRESSION

Table (3) shows the stepwise multivariate regression analysis for predicting the OS, as it shown the dimensions CC has been excluded from the model due to its weak insignificant impact (P > 0.05), however, three variables were included in the model and regression equation. TW showed larger effect on OS with ($\beta_4 = 0.467$) and determination coefficient ($R^2 = 0.519$), followed by EA with ($\beta_1 = 0.341$) and ($\beta_4 = 0.358$) and determination coefficient ($R^2 = 0.687$) with ($R^2$ change = 0.168), and then SV with ($\beta_2 = 0.235$), ($\beta_1 = 0.252$), ($\beta_4 = 0.304$) and determination coefficient ($R^2 = 0.747$) with ($R^2$ change = 0.060), overall, there are three variables have shown 0.747 of changes in OS. and the generated regression equation was:

$$\text{OS} = 0.871 + 0.304 \times TW + 0.252 \times EA + 0.235 \times SV$$

### CONCLUSION AND DISCUSSION

In recent years, the public healthcare sector in Iraq has suffered from the conditions of the war on terror, which have affected the provision of logistical and financial capabilities. Therefore, the private healthcare sector has emerged as a competitive alternative, requiring effective strategic tools for its sustainability.

The main objective of this study is to identify the role of scenario planning in organizational sustainability in the private healthcare sector in Iraq. Various studies have indicated that the sustainability of the healthcare sector is vital and important, so it needs so many
factors to achieve.

The literature identified that the core characteristics of sustainability require that the organization be ready for administrative intervention and organizational change, instilling values geared towards sustainability and supporting senior management, making sustainability the core of business strategy, and supporting factors that are compatible with its requirements.

Several WHO reports have indicated that the sustainability of the healthcare sector has become a key global goal, requiring the provision of many strategic factors to maintain the health and well-being of people. Especially with complex and changeable environment under environmental uncertainty, moreover, only strategic formulation does not achieve the desired results in many organizations, but it need many other strategic factors.

The current study found that the teamwork have greatly affected the organizational sustainability of the private healthcare sector, with the satisfaction of the respondents that cooperation within one team leads to positive results in their work, working as a team to unify efforts and make effective strategic decisions.

In this regard, literature stressed the importance of adopting teamwork in high-risk industries such as healthcare, as they have an important role to play in providing quality care. And that cooperation among individuals reflected positively on the improvement of healthcare outcomes, where teams contribute to accuracy and knowledge, effective communication, listening to clinical team members, and gaining collective knowledge and decision-making. Decision-making requires environmental analysis and identification of strengths, weaknesses, opportunities and threats within (SWOT). Environmental analysis is a key factor in achieving a clear future scenario by taking into account internal and external environmental factors, and it directly affects health expenditure and building a clear scenario for the future. This result was proved to be adopted by private healthcare organizations in Iraq, the results showed that environmental analysis is a key factor for health and strategic decisions, which was confirmed by Iraqi physicians in the sample of the study.

In this regard, USAID pointed to the need to rely on environmental analysis to analyze the current situation and conduct health assessment and to make decisions that contribute to improving the quality of healthcare in Iraq. These require decisions to be linked to providing a work environment that is not threatened. In this context, the Iraqi ministry of health has set a basic goal of providing comprehensive and sustainable healthcare requirements in Iraq as part of the objectives of Iraq’s e-governance strategy.

The strategic vision has been shown to influence the future status of the organization and to build sustainability. It is the ideal future and a road map for the desired future and future of competitive aspirations, the results also show that physicians believe that providing a strategic vision helps determine the direction in which the organization wants to move, its desired goals, and the choice of appropriate strategies.

However, the present study found no significant impact of the core competencies on organizational sustainability, conversely, Hafeez & Malak (2002) did, indicated that core competencies are key factors in sustainability and competition. This discrepancy in findings may be due to different setting in both studies, as well as the fact that the healthcare sector in Iraq has sufficient number of expert and skilled professionals that are capable to achieve organizational sustainability, additionally other factor could play a role in the sequence of priorities in Iraqi healthcare sector. In summary, the present study proved that the three key elements of scenario planning (teamwork, environmental analysis and strategic vision) had significant impact on achieving organizational sustainability in private healthcare sector. Hence, implementation of scenario planning in private healthcare with presence of good environmental analysis and an effective strategic vision could improve the ability of the medical teams to making joint decisions.

**Conflict of Interest** Author declared: None

**Source of Funding:** Self-funded

**Ethical Clearance:** Data of participants were collected according to the Declaration of Helsinki, Informed verbal consent was obtained from each participant, and all official agreements were obtained from the concerned private healthcare sectors prior to initiation of the study

**REFERENCES**

192


24. Rasudin NS, Shoaimi S, Hassan SA, Zainuddin H. A Validation Study of the Malay Version of the


38. USAID, U.S. Agency for International Development. guideline has been developed in Iraq in close collaboration with the Ministry of Health (MoH) in 2012.


Detection of Bacterial Causes of Psoriasis and Determination of Some Immunological Aspects in Patients

Zainab Nasser Nabat
Babylon Technical Institute/ AL-Furat AL Awsat Technical University, Babylon, Iraq

ABSTRACT
The present study included 80 swabs and 5ml blood were collected from 80 patients with psoriasis and 80 controls who admitted to margin hospital during the period from November 2016 to May 2017. Culture investigations showed 71 positive bacterial growths instead 79 bacterial positive growth. Staphylococcus aureus was the most common isolate 23 (28.75%) of the total samples. followed by Staphylocoous epidermis 14 (17.5%) followed by Proteus species 10 (12.5%) followed by Streptococcus pyogenes 8 (10%) followed by Eschericha coli 6 (7.5%) followed by Enterobacter aerogenes 4(5%) followed by Klebsiella pneumonia 3 (3.75%) followed by Pseudomonas aeruginosa 2 (2.5%) followed by Serratia marcescens 1(1.25%) and No growth was shown by 9 (11.25%) of the total isolates. The study deals also with detection of cytokines concentration IL-18 showed increased at in concentration especially in age group (56-60 years) years and reached 338.333 pg/ml compared to control group. IL22 showed increase in their concentrations in psoriasis patient than in controls particularly at age group (51-55years) years which reached 3028.6667 pg/ml.

Keywords: Psoriasis, Bacteria, IL18, IL22

INTRODUCTION
Psoriasis is a chronic inflammatory skin disturbance infect 1-2% of the general people that is characterized by well-defined scaly erythematous plaque. Other characteristic lesions reported were plaque containing hyper-proliferating keratinocytes as well as infiltrating neutrophils, monocytes, and T-lymphocytes [1]. As cytokines play substantial role in inflammatory diseases, much attention has been directed towards the influence of cytokines in psoriasis. In addition, a number of studies have suggested that various cytokines released by keratinocytes and inflammatory leucocytes could contribute to the induction or persistence of the inflammatory processes in psoriasis; however, the precise mechanism of their involvement in psoriasis remains hazy [2]. Although the cytokine-mediated response is an essential part of the natural protective mechanism, excessive production of pro-inflammatory cytokines, or production of cytokines in the wrong biological context, are associated with the pathology in a wide range of diseases including psoriasis. At the present time, many researches in the psoriasis field concerns the role of cytokines in the pathogenesis of this disease. Different cytokines play a part in sustaining the two main characteristics of a psoriatic lesion; keratinocyte hyperproliferation and inflammation [3]. Psoriasis is associated with an overexpression of pro inflammatory cytokines produced by T helper1 (Th1) cells and under expression of Th2 cytokines [4]. Interleukin-18 (IL-18) is a proinflam-matory cytokine that stimulates T cells and natural killer cells (NK) and promote innate immunity as well as specific Th1 immune responses. Human keratinocytes produce IL-18, like monocytes and macrophages do, being two major origin of this molecule [5]. IL-18 acts directly on NK cells to stimulate INF-γ synthesis and upregulate their killing capacity it is believed that IL-18 derived from keratinocytes might be implicated in the cutaneous Th1- type immune response .confirmed leaflet have shown that IL-18 expression in psoriatic skin is higher than in normal skin [6]. Interleukin (IL)-18 has been described to play a role in multiple inflammatory skin diseases like eczema.
and psoriasis\textsuperscript{(7)} . IL-22 which is produced by multiple sub-populations of lymphocytes especially Th17, Th1 and Th22 cells. Modern studies have shown increased expression of IL-22 in psoriatic lesions and raised serum levels in these patients compared to healthy subjects \textsuperscript{(8)}. IL-22 is a pro-inflammatory cytokine playing a crucial role in the pathogenesis of psoriasis, an autoimmune chronic inflammatory skin disease\textsuperscript{(9)}.

**MATERIAL AND METHOD**

**Sample Collection**

This study includes a total of 80 swabs and 5ml blood were collected from 80 patients with psoriasis and 80 controls who admitted to margin hospital during the period from November 2016 to May 2017. Swabs were collected from patient psoriasis by disposable transport media sterile. Swabs were taken and close it until transported to laboratory. Microbiological analysis was done and the organisms were identified by direct Gram staining, culture methods on Nutrient Agar, Blood Agar, MacConkey agar, Chocolate Agar Medium, Simonn Citrate Medium and Eosin Methylene Blue (EMB) Agar at 37 for 42h. And different biochemical tests like catalase test, oxidase, indole, Simonn Citrate, coagulase, voges-proskauer (VP), methyl red (MR),capsule test, motility test, Bacitracin sensitivity test, Urease and were performed for the identification of the various bacterial pathogens after their isolation (Collee and Watt ,1996).5ml of blood were collected by disposable syringe, blood was put in tube without anticoagulant. The serum was separated by centrifugation at about 3000 rpm for 5mint. Serum levels of IL22 and IL-18 were measured by enzyme linked immunosorbent assay (ELISA) applies a technique called a quantitative sandwich immunoassay using Peprotech (USA) kit.

**RESULT**

The patients comprised 55 (68.75%) female and 25 (31%) male at the age of (15-60) years were selected for the study.

**Bacteriological Identification**

*Staphylococcus aureus* was the most common isolate 23 (28.75%) of the total samples. followed by *Staphylocoous epidermis*14 (17.5%) followed by *proteus* species 10 (12.5%) followed by *Streptococcus pyogenes* 8 (10%) followed by *Eschericha coli* 6 (7.5%) followed by *Enterobacter aerogenes* 4(5%) followed by *Klebsiella pneumonia* 3 (3.75%) followed by *Pseudomonas aeruginosa* 2 (2.5%) followed by *Serratia marcescens* 1(1.25%) and No growth was shown by 9 (11.25%) of the total isolates as shown in Table (1)

<table>
<thead>
<tr>
<th>Type of bacteria</th>
<th>Total</th>
<th>Percentage%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>23</td>
<td>28.75%</td>
</tr>
<tr>
<td>Staphylocoous epidermis</td>
<td>14</td>
<td>17.5%</td>
</tr>
<tr>
<td>proteus species</td>
<td>10</td>
<td>12.5%</td>
</tr>
<tr>
<td>Streptococcus pyogenes</td>
<td>8</td>
<td>10%</td>
</tr>
<tr>
<td>Eschericha coli</td>
<td>6</td>
<td>7.5%</td>
</tr>
<tr>
<td>Enterobacter aerogenes</td>
<td>4</td>
<td>5%</td>
</tr>
<tr>
<td>Klebsiella pneumonia</td>
<td>3</td>
<td>3.75%</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>2</td>
<td>2.5%</td>
</tr>
<tr>
<td>Serratia marcescens</td>
<td>1</td>
<td>1.25%</td>
</tr>
</tbody>
</table>

**Table (1) the prevalence and percentage of bacteria isolated from Psoriasis**

IL18

The study shows high values of IL-18 in patient’s serum compared to healthy and high values in age class (56-60 years) reach338.333 pg/ml compared to in healthy and in same classes 160.667pg/ml, with a significant increase in mean values (P >0.05), between values, IL-18 in patients compared to healthy and also between the age group (21-25 years) shows low values of IL-18 which reach 49. 333pg/ml compared to in healthy, as in table (2).

<table>
<thead>
<tr>
<th>Age group</th>
<th>IL-18 pg/ml Patient (M ± S.D)</th>
<th>IL-18 pg/ml Control (M ± S.D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-20</td>
<td>50±5</td>
<td>27.6667±2.51661</td>
</tr>
<tr>
<td>21-25</td>
<td>49.333± 5.075</td>
<td>17.333± 2.51661</td>
</tr>
<tr>
<td>26-30</td>
<td>77.333± 6.65833</td>
<td>57.000± 2.64575</td>
</tr>
<tr>
<td>31-35</td>
<td>81.333±5.13160</td>
<td>38.667±5.50757</td>
</tr>
<tr>
<td>36-40</td>
<td>99.000± 1.000</td>
<td>77.6667±2.08167</td>
</tr>
<tr>
<td>41-45</td>
<td>188.000± 1.000</td>
<td>111.333± 11.01514</td>
</tr>
<tr>
<td>46-50</td>
<td>191.333± 4.9328</td>
<td>140.333± 11.93035</td>
</tr>
<tr>
<td>51-55</td>
<td>261.6667± 34.78985</td>
<td>178.6667± 6.11010</td>
</tr>
<tr>
<td>56-60</td>
<td>338.333±33.29164</td>
<td>160.6667± 6.02771</td>
</tr>
</tbody>
</table>

LSD=4.95, (P >0.05).

IL22
The study shows high values of IL-22 in patient’s serum compared to healthy and high values in age class (51-55 years) reach 3028.6667 pg/ml compared to in healthy and in same classes 201pg/ml. with a significant increase in mean values (P >0.05), between values, IL-22 in patients compared to healthy and also between the age group (15-20 years) shows low values of IL-22 which reach 31.6667 pg/ml compared to in healthy, as in table (3).

<table>
<thead>
<tr>
<th>Age group</th>
<th>IL-122 pg/ml</th>
<th>IL-22 pg/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-20</td>
<td>31.6667±1.52753</td>
<td>14.333±3.21455</td>
</tr>
<tr>
<td>21-25</td>
<td>60± 5</td>
<td>15.33± 3.51188</td>
</tr>
<tr>
<td>26-30</td>
<td>84.33± 4.04145</td>
<td>73±3.6055</td>
</tr>
<tr>
<td>31-35</td>
<td>71.667± 6.65833</td>
<td>37±6.08276</td>
</tr>
<tr>
<td>36-40</td>
<td>95±5</td>
<td>58± 9.84886</td>
</tr>
<tr>
<td>41-45</td>
<td>217±7</td>
<td>146.6667± 3.05505</td>
</tr>
<tr>
<td>46-50</td>
<td>284± 12.4900</td>
<td>165.33± 5.03322</td>
</tr>
<tr>
<td>51-55</td>
<td>3028.6667± 6.11010</td>
<td>201± 12.49</td>
</tr>
<tr>
<td>56-60</td>
<td>452.333± 571.30581</td>
<td>75.333± 4.72582</td>
</tr>
</tbody>
</table>

LSD=54.2 (P >0.05).

**DISCUSSIONS**

Many researchers reported that psoriasis occurs in any gender or race with equal male to female ratio (10). *Staphylococcus aureus* was the most common isolate 23 (28.75%) of the total samples. followed by *Staphylococcus epidermis*14 (17 .5%) followed by *proteus* species 10 (12.5%) followed by *Streptococcus pyogenes* 8 (10%) followed by *Escherichia coli* 6 (7.5%) followed by *Enterobacter aerogenes* 4(5%) followed by *Klebsiella pneumonia* 3 (3.75%) followed by *Pseudomonas aeruginosa* 2 (2.5%) followed by *Serratia marcescens* 1(1.25%) and No growth was shown by 9 (11.25%) of the total isolates .Several studies refer to similarity in bacterial isolates with this study (11) and (12). which were found Staphylococcus auras formed (28%) , (24%) respectively. *Staphylococcus aureus* was the mostly isolated bacteria among all pathogens and this might be attributed to the antiphagocytic effect of protein A, that is a virulence factor of staphylococcus aureus. And also an important factor contributing to Staphylococcal infection in these patients is due to the inhibitory effect of the serum exuding from the affected area on linoleic acid (13).

**Immunological Assay for psoriasis patients**

**Role of IL-18 in psoriasis patients**

Psoriasis is a chronic inflammatory disease characterized by number of immune regulatory abnormalities. The pestes in psoriasis develop secondary to T-cell mediated hyper proliferation of keratinocytes which is induced by antigen-presenting cells on the skin. (14).Cytokines contribute to the induction or persistence of the inflammatory processes in psoriasis .A number of cytokines and chemokine’s that either activate or suppress immune responses were secreted by Keratinocytes .However, precise mechanism of their involvement in psoriasis remains hazy. Any local or systemic stimulus may stimulate keratinocyte cytokines production .The pattern of cytokine expression suggests that Th1 cells may mediate or maintain disease {15}. Interleukin-18, a defined member of IL-1 cytokine family, was known as IFN-γ stimulating factor. Subsequent studies clarified that this cytokine has wide range effects other than lymphocyte activation. As it is an important regulator in the production of both innate and acquired immune responses, IL-18 directly regulates the monuments of T and B cells, NK cells, macrophages and dendritic cells; it acts usually synergistically with IL-12 (16). IL-18 has been found to have a variety of biological actions. As a pleiotropic cytokine, it can play an immunoregulatory role in the human defense system, especially in inflammatory, infectious and autoimmune diseases (15). The study shows high values of IL-18 in patient’s serum compared to heal{17}thy and high values in age class (46-50 years) reach 41.33pg/ml compared to in healthy and in same classes 23.96 pg/ml. with a significant increase in mean values (P >0.05), between values, IL-18 in patients compared to healthy and also between the age group (15-20years) shows low values of IL-18 which reach 31.667pg/ml compared to in healthy. This result was similar to the results reported by previous study which showed that serum IL-18 levels were higher in psoriatic patients than healthy control (18).
and [18]. The study shows significant differences between the first and third age groups, as well as significant differences between the first and fourth age groups, as well as significant differences between the second and fifth age groups. There were also significant differences between the first and fifth age groups. The results showed significant differences between the first age group and the six age group. The results also showed significant differences between the second and fourth age groups. The results also showed significant differences between the second and fifth age groups, as well as significant differences between the second and sixth age groups. The results also showed significant differences between the fourth and fifth age group as well as significant differences between the fourth and sixth age groups. The results also showed significant differences between the age group 5 and the age group 6, and there were significant differences between the age group 5 and the seventh age group. There were also significant differences between the age group 5 and the eighth age group. There were also significant differences between the age group 5 and the ninth age group. The results of the study showed significant differences between the age group 6 and the eighth age group, as well as significant differences between the age group 6 and the ninth age group. The results showed significant differences between the seventh and eighth age groups, as well as significant differences between the seventh and ninth age groups. The results also showed significant differences between the age group 8 and the ninth age group.

**IL22**

Exploring the role of IL-22 in the immunopathogenesis of psoriasis in recent years has revealed that IL-22 could be considered as an essential player in the inflammatory process of psoriasis [19]. The study shows high values of IL-22 in patient’s serum compared to healthy and high values in age class (56-60 years) reach 33.3pg/ml compared to in healthy and in same classes 21.2pg/ml. with a significant increase in mean values (P >0.05), between values, IL-22 in patients compared to healthy and also between the age group (15-20 years) shows low values of IL-22 which reach 31.6667 pg/ml compared to in healthy. This result was similar to the results reported by previous study which showed that serum IL-22 levels were higher in psoriatic patients than healthy control [20].

The results showed that there were significant differences between the first and fourth age groups. The results also showed a significant difference between the first and fifth age groups. The results also showed significant differences between the first and sixth age groups as well as significant differences between the first and seventh age groups, the results showed significant differences between the first and ninth age groups. The results showed significant differences between the second and sixth age groups as well as between the second and seventh age groups. The results also showed significant differences between the second and eighth age groups as well as between the second and ninth age groups. The results showed that there were significant differences between the third and sixth age groups. There were also significant differences between the third and seventh age groups. There were also significant differences between the first and eighth age groups. The results showed significant differences between the third and ninth age groups. The results showed that there were significant differences between the age group 4 and the sixth age group. The results also showed significant differences between the age group 4 and the age group 7. The results showed significant differences between the age group 4 and the eighth age group. The results also showed significant differences between the age group 4 and age group Ninth. The results also showed significant differences between the 5 and 7 age groups, as well as significant differences between the 5 and 8 age groups. The results also showed significant differences between the 5 and 9 age groups. The results also showed significant differences between the age group 6 and the seventh age group. There were also significant differences between the age group 6 and the seventh age group. The results also showed significant differences between the age group and the ninth age group.

**CONCLUSIONS**

The results of the current study that represented *Staphylococcus aureus* was the most common isolate in psoriasis patients. Levels of cytokines IL18, IL-22 were increased significantly in psoriasis patients compared to control.

**Ethical Clearance:** informed consent was obtained and oral permission from all participants in this study.
Source of Funding - Self

Conflict of Interest - Nil

REFERENCES


Assessment of Knowledge, Attitude and Practices about Rabies in Urban Slums of Amritsar City (Punjab), India

Kanwal Preet Kaur Gill¹, Priyanka Devgun²

¹Associate Professor, ²Professor & Head, Department of Community Medicine, Sri Guru Ram Das Institute of Medical Sciences & Research, Amritsar (Punjab)

ABSTRACT

Introduction: Rabies is a zoonotic, viral disease infecting mammals. It is a dead end for the virus and dead end for the man. But unfortunately, poorly known are the opinions and practices of people following dog bite. Hence the current study was planned with the objective of assessing knowledge, attitude and practices about rabies in slum areas of Amritsar.

Materials and Method: The study was conducted in the peri-urban slums of Amritsar city. The sample size of 400 was selected using Population Proportion to Size method in the different slum pockets. A pretested proforma was used to gather information after taking informed consent of the participants. Data was compiled and analyzed using SPSS 19.0 windows evaluation version.

Results: A vast majority (92.7%) of the respondents could correctly tell what rabies is including its symptoms, but rabies is always fatal was known only to 34.6% of the respondents. Only 46.5% subjects knew that antirabies vaccine (ARV) is available free of cost at district hospitals. Among bite afflicted, 52.8% of them took ARV. The better off were more likely to seek ARV (OR=7.43, CI=1.66 to 33.26). Similarly, literates were 2.3 times more likely to have ARV than the illiterates with OR =2.31 (CI = 1.32-4.06). The ARV was taken from private sector by a huge (71.9%). The attending health care personnel was qualified in only 35.2% of the cases. All (100%) of the dog bite afflicted performed local wound toilet and 76.5% of cases tried different alternate modalities as well. Having no resources came out to be the single most important factor for not getting ARV.

Conclusion: There is a knowledge gap regarding rabies which requires urgent attention.

Keywords: rabies, slums, knowledge, attitude, practices.

INTRODUCTION

Rabies is a zoonotic, viral disease infecting mammals. Rabies infection in man is a dead end for the virus and dead end for the man. It is always fatal following the appearance of clinical symptoms. In no other disease does the adage prevention is the only cure hold more true. According to World Health Organization, an estimated 59 000 people are dying from rabies across the world each year. Around 90% of these deaths are occurring among children living in rural areas in Africa and Asia. In India alone, 18 000 to 20 000 human deaths occur from rabies each year. But the exact incidence of rabies in India is not known because many of the deaths are outside of medical facilities – meaning their deaths go unrecorded.¹ In up to 99% of cases, dogs are responsible for rabies virus transmission to humans. Rabies predominantly affects the poor. Catastrophic out-of-pocket expenses and lack of transportation from rural areas prevent many of the poorest people in India from accessing primary health-care services, leaving them to carry the burden of rabies.¹ So, this section of population

Corresponding author:
Dr Kanwal Preet Kaur Gill
Associate Professor, Department of Community medicine, Sri Guru Ram Das Institute of Medical Sciences & Research, Amritsar
bears the double burden of poor knowledge of rabies and its prevention and poor access to health care. The situation is particularly poignant because, in contrast to some other diseases, a highly effective treatment already exists. Rabies is entirely preventable even after severe exposure, provided post-exposure prophylaxis, completed with rabies immunoglobulin, can be given.

Also relatively poorly known are the opinions and practices of people following dog bite. This baseline information is very essential before an effective campaign can be mounted to counter the menace of rabies. World Health Organization, Food and Agriculture Organization, World Organization for Animal Health (OIE), and the Global Alliance for Rabies Control came together to form a very ambitious framework to reach zero human rabies deaths by 2030. This initiative marks the first time that both the human and animal health sectors have come together to adopt a common strategy against this devastating and massively neglected disease.² Hence the current study was planned with the objective of assessing knowledge, attitude and practices about rabies in slum areas of Amritsar.

MATERIALS AND METHOD

The study was conducted in the peri-urban slums of Amritsar city. According to records available from Civil Surgeon office, 17 discrete slum pockets have been identified in the peri-urban Amritsar. The sample size was calculated presuming prevalence of awareness regarding rabies to be to be 50% and allowable error (L) of 10% of prevalence. The sample size came out to be 400. The households were selected from different slum pockets by using Population Proportion to Size method. One adult member of the selected households who was willing to participate, was taken as study subject. If the residents of the selected house were not available on first visit, the household was revisited. If the residents were again not available, the next house was selected as an alternative. The study subjects were interviewed after taking informed consent by using a pretested structured questionnaire which had been validated during pilot testing. History of dog bite for the past 5 years was enquired. Data was compiled and analyzed using SPSS 19.0 windows evaluation version. Institutional ethical clearance was taken prior to commencement of the study.

FINDINGS

Table 1: Socio-demographic profile of the respondant subjects (n=400)

<table>
<thead>
<tr>
<th>Socio-demographic factor</th>
<th>Number n = 400</th>
<th>Percentage (100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>261</td>
<td>65.3</td>
</tr>
<tr>
<td>Female</td>
<td>139</td>
<td>34.7</td>
</tr>
<tr>
<td>Educational status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>217</td>
<td>54.3</td>
</tr>
<tr>
<td>Up to primary</td>
<td>145</td>
<td>36.2</td>
</tr>
<tr>
<td>Up to matric</td>
<td>34</td>
<td>08.5</td>
</tr>
<tr>
<td>Above matriculation</td>
<td>04</td>
<td>01.0</td>
</tr>
<tr>
<td>SES*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Upper middle</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Lower middle</td>
<td>17</td>
<td>04.2</td>
</tr>
<tr>
<td>Upper lower</td>
<td>56</td>
<td>14.0</td>
</tr>
<tr>
<td>Lower</td>
<td>327</td>
<td>81.8</td>
</tr>
</tbody>
</table>

* SES (Socio-economic Status) – Kuppuswami Scale was used.

Table 1 depicts that among 400 respondents, 65.3% were males while 34.7% were females with average ages of 41±5.7 years and 36±4.3 years respectively. Nearly half (54.3%) of them were illiterate and only 1.0% had studied above matriculation. Majority 327 (81.8%) belonged to lower socioeconomic status according to modified Kuppuswami socioeconomic scale. Of the 400 respondents interviewed, 242 (60.5%) gave a history of dog bite in the household in the period extending to previous 5 years. Also, 73.5% of these dog bites were from stray dogs and pups and a whopping 88% were unprovoked bites.
**Table 2: Knowledge of the subjects about rabies**

<table>
<thead>
<tr>
<th>Responses of the subjects (n=400)</th>
<th>Yes</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correctly know what is rabies</td>
<td>371</td>
<td>(92.7)</td>
</tr>
<tr>
<td>Correctly mentioned any one of modes of transmission</td>
<td>302</td>
<td>(75.5)</td>
</tr>
<tr>
<td>Correctly mentioned animals (other than dog) which spread rabies</td>
<td>156</td>
<td>(39)</td>
</tr>
<tr>
<td>Is rabies always fatal</td>
<td>139</td>
<td>(34.6)</td>
</tr>
<tr>
<td>Can consumption of milk of a rabid milch animal cause rabies</td>
<td>283</td>
<td>(70.7)</td>
</tr>
<tr>
<td>Is there a need for vaccination if the biting dog is vaccinated</td>
<td>05</td>
<td>(1.2)</td>
</tr>
<tr>
<td>Is ARV safe in pregnancy/lactation and young children</td>
<td>53</td>
<td>(13.2)</td>
</tr>
<tr>
<td>Are stray dogs a public health menace?</td>
<td>389</td>
<td>(97.2)</td>
</tr>
<tr>
<td>Do you know the location of the nearest government health facility where ARV is available</td>
<td>186</td>
<td>(46.5)</td>
</tr>
<tr>
<td>Do you know ARV is available free of cost in government health facility?</td>
<td>81</td>
<td>(20.2)</td>
</tr>
</tbody>
</table>

It was observed that (Table 2) a vast majority 371 (92.7%) of the respondents could correctly tell what is rabies including its symptoms. Also, 302 (75.5%) could mention at least one mode of transmission of rabies. That rabies is always fatal was known to only 139 (34.6%) of the respondents. Except for 5 respondents, all were under the impression that if bitten by a dog which has been fully vaccinated, there is no need for vaccination with anti-rabies vaccine. Of all study subjects, 389 (97.2%) considered stray dogs to be a public health menace. Only 186 (46.5%) subjects knew the location of the nearest government health facility where ARV was available and a dismal that only 81 (20.2%) knew that ARV is available free of cost at government health facilities.

**Table 3: Relationship between category of bite and ARV taken**

<table>
<thead>
<tr>
<th>Category of bite</th>
<th>Number of dog bite victims</th>
<th>ARV taken No. (%)</th>
<th>ARV not taken No. (%)</th>
<th>$\chi^2$ value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27</td>
<td>6 (22.2)</td>
<td>21 (77.8)</td>
<td>19.08</td>
<td>0.000072</td>
</tr>
<tr>
<td>2</td>
<td>182</td>
<td>96 (52.7)</td>
<td>86 (47.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>33</td>
<td>26 (78.3)</td>
<td>7 (21.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>242</td>
<td>128 (52.8)</td>
<td>114 (47.1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows that among total 242 study subjects having dog bite, 52.8% of them took anti-rabies vaccination. Also, it was observed that as the severity of bite increased, the proportion of afflicted getting ARV treatment also increased. It was found that 78.3% out of 33 category 3 bites sought ARV against 96 (52.7%) of the category 2 bites. This difference was statistically significant.

**Table 4: Association between certain parameters and ARV**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>ARV taken (n=128)</th>
<th>ARV not taken (n=114)</th>
<th>Total (n=242)</th>
<th>OR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper to Middle</td>
<td>15 (88.2%)</td>
<td>2 (11.8%)</td>
<td>17</td>
<td>7.43</td>
<td>0.0055</td>
</tr>
<tr>
<td>Upper Lower &amp; Lower</td>
<td>113 (50.2%)</td>
<td>112 (49.3%)</td>
<td>225</td>
<td>(1.66-33.26)</td>
<td></td>
</tr>
<tr>
<td>Literacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>literate</td>
<td>52 (66.6%)</td>
<td>26 (33.4%)</td>
<td>78</td>
<td>2.31</td>
<td>0.0047</td>
</tr>
<tr>
<td>Illiterate</td>
<td>76 (46.3%)</td>
<td>88 (53.7%)</td>
<td>164</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The perusal of table 4 shows that 15 (88.2%) of the households belonging to the upper to middle class chose to have ARV as against only 113 (50.2%) of the lower economic strata. The better off were more likely to seek and this difference was found to be statistically significant. Also, 52 (66.6%) literate took ARV against 76 (46.3%) illiterates.

Table 5: Practices following dog bite

<table>
<thead>
<tr>
<th>Practices (n=128)</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>From where treatment sought</td>
<td></td>
</tr>
<tr>
<td>Public health facility</td>
<td>36 (28.1%)</td>
</tr>
<tr>
<td>Private/ clinic/ charitable institution</td>
<td>92 (71.9%)</td>
</tr>
</tbody>
</table>

| Treating health care personnel |       |
| Qualiﬁed | 45 (35.2%) |
| Allied/ RMP/ chemist/nurse | 83 (64.8%) |

| How soon treatment sought (n=128) |       |
| Same day of bite | 04 (0.02%) |
| Within 10 days | 74 (57.8%) |
| Later or cannot recall | 50 (39.0%) |

| How many injections of ARV taken (n=128) |       |
| 1-2 | 13 (10.1%) |
| 3-4 | 56 (43.7%) |
| 5-6 | 18 (14.0%) |
| Do not know/ cannot recall | 41 (32.0%) |

| Anything else administered by caring health personnel* |       |
| Inj. Tetanus | 67 (52.3%) |
| Painkiller | 36 (28.1%) |
| Antibiotic | 102 (79.6%) |
| Given, but do not know what it was | 43 (33.6%) |

| Local wound toilet done by yourself or HCP (n=128) | 128 (100%) |

| Did you follow any dietary restrictions during vaccination or for some time afterwards* | 106 (82.8%) |
| If yes, what restrictions |       |
| Did not consume meat, fish and eggs | 44 |
| Alcohol abstinence | 58 |
| Avoidance of ‘hot foods’ | 87 |

| What else was done at the bitten site* | 98 (76.5%) |
| Apply turmeric, antiseptic | 84 |
| Apply caustic, chillies | 12 |
| Went to faith healer | 73 |
| Took non allopathic treatment | 59 |

* multiple responses

Among 242 dog bite afflicted, 128 of them gave the history of ARV. The ARV was taken from private sector by a huge 92 (71.9%). The attending health care personnel was qualiﬁed in only 45 (35.2%) of the cases. Only 4 (0.02%) started ARV on the day of bite while 50 (39.0%) either did not have any recollection of when ARV was started or was started after 10 days of bite. As far as the number of doses of ARV were concerned, only 18 (14%) completed the post exposure course. However, 128 (100%) of the dog bite victims performed
local wound toilet. In the present study, 102 (79.6%) of the afflicted were prescribed antibiotics for ‘infection control’. Some kind of dietary restriction like avoidance of alcohol, hot foods etc was followed in 106 (82.8%) cases and 98 (76.5%) cases tried different alternate modalities (Table 5).

DISCUSSION

In the current study, it was observed that a vast majority 371 (92.7%) of the respondents could correctly tell what is rabies including its symptoms. These findings are in consistent with another study conducted in Ethiopia in 2016. Also, 302 (75.5%) could mention at least one mode of transmission of rabies. Though rabies is a fatal disease, it was known only to 139 (34.6%) of the respondents. In another study conducted in slums of Karnataka, 54.1% knew that it is a fatal disease. Except for 5 respondents, all were belaboring under the impression that if bitten by a dog which has been fully vaccinated, there is no need for vaccination with anti-rabies vaccine. Of all study subjects, 389 (97.2%) respondents considered stray dogs to be a public health menace. Whereas in another WHO sponsored multicentric study, 83% respondents reported the presence of stray dogs and 23% considered it a menace. Only 186 (46.5%) subjects knew the location of the nearest government health facility where ARV was available and a dismal that only 81 (20.2%) knew that ARV is available free of cost at District hospitals. In a study conducted in rural areas of Delhi, 70% of the respondents knew it. It reflects that lack of awareness might be the reason for not visiting hospital for getting ARV.

Of the 400 respondents interviewed, 242 gave history of dog bite in the household in the period extending to previous 5 years. Among these, 178 (73.5%) of these dog bites were from stray dogs and pups and while 213 (88%) were unprovoked bites like another study in rural area of North Bengal. Among total 242 study subjects having dog bite, 52.8% of them took anti-rabies vaccination whereas the figure was found to be higher (80%) in a study conducted in Delhi. Also, it was observed that as the severity of bite increased, the proportion of afflicted getting ARV treatment also increased. It was found that 78.3% out of 33 category 3 bites sought ARV against 96 (52.7%) of the category 2 bites. This difference was statistically significant (p value - 0.000072). Similar findings were observed in a study conducted in field practice are of AIIMS Delhi reflects lack of awareness which needs to be addressed.

Table 4 shows that economic status of the family had a significant bearing on the option to have ARV treatment. It was observed that 15 (88.2%) of the households belonging to the upper to middle class chose to have ARV as against only 113 (50.2%) of the lower economic strata (OR=7.43, CI=1.66 to 33.26) and this difference was found to be statistically significant (p<0.05). Literacy also seemed to have a significant role in seeking ARV. The literate were significantly more likely to have ARV than the illiterate with OR =2.31 (CI- 1.32 to 4.06). These finding are consistent with the findings of another study which proved that illiteracy was associated with poor awareness.

Table 5. The ARV was taken from private sector by a huge 92 (71.9%) of the 128 dog bite afflicted. The attending health care personnel was qualified in only 45 (35.2%) of the cases. Only 4 (0.02%) started ARV on the day of bite while 50 (39.0%) either did not have any recollection of when ARV was started or was started after 10 days of bite where as in a study conducted in North Bengal the time for starting ARV ranged from 3 to 72 hours. As far as the number of doses of ARV were concerned, only 18 (14%) completed the post exposure course reflecting that urgent action is required to eliminate this menace.

According to World Health Organization, washing wounds thoroughly with soap and water after a bite is an effective way of preventing infection. In the current study, it was interesting to know that, 128 (100%) of the dog bite victims performed local wound toilet whereas the figure is low in other studies. Rationale use of antibiotics is a must to prevent emergence of antibiotic resistance. In the present study, 102 (79.6%) of the afflicted were prescribed antibiotics for ‘infection control’. Some kind of dietary restriction like avoidance of alcohol, hot foods etc. was followed in 106 (82.8%) cases. And 98 (76.5%) cases tried different alternate modalities. In another study in rural area of North Bengal 10.4% of respondents applied lime, kerosene or any other oil indicating knowledge gap which needs to be addressed.

CONCLUSION

There is a wide gap regarding prevention of rabies. Hence public education campaigns should be conducted to make people aware of existence of rabies and of the
importance of seeking medical care at right time after animal bite. Regular uninterrupted supply of vaccine needs to be ensured.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

**Ethical Clearance:** Ethical clearance was taken from Ethical committee of Sri Guru Ram Das Institute of Medical Sciences & Research, Amritsar.

**REFERENCES**


Faeces Waste Treatment Design in Household with Narrow Land Area

Marlik¹, Demes Nurmayanti¹, Ferry Kriswandana¹, Heru Santoso Wahito Nugroho¹

¹Health Polytechnic of Ministry of Health at Surabaya, Indonesia

ABSTRACT

Recently, the distance of wastewater infiltration from septic tank and clean water source is not suitable because developers build houses with narrow land area so that the house price is affordable. This research aimed at analyzing faeces waste treatment design in household with narrow land area, using experimental design. The variables were Coliform bacteria and turbidity of wastewater that passed the treatment design in the distance of 0, 5, 7, 9, 11, and 13 meters. The obtained data was analyzed using Anova. Domestic wastewater treatment design with narrow land area needed at least 3 m². It could reduce Coliform bacteria until 13 meters in 74 colony/100 ml, meanwhile, the turbidity in the distance of 0 meter was qualified into the determined requirement with the average of 19.49 NTU. It could reduce either Coliform bacteria or turbidity significantly in every distance and in the distance of 13 meters, the percentage of decrease was 88.42% for Coliform bacteria, meanwhile, 98.14% was for turbidity.

Keywords: Septic tank, Coliform, Turbidity

INTRODUCTION

Residence is one of primary human needs after food and clothing needs. That is why Decree of the State Minister of Agrarian Affairs, guaranteed the homeowner for Indonesian citizen in establishing the rights for the land where his / her residence is and this is assigned for either the residence with narrow land area or the residence with large land area.(1)

The residence with narrow land area had a specialty and looked after by Indonesian government. Based on Regulation of Indonesian Minister of Finance, the requirement of simple residence and very simple residence is having exemption for value-added tax. In this case, the regulation of Indonesian Minis ter of Finance has criteria regarding what is meant by simple residence and very simple residence, where the building area did not exceed from 36 m², the selling price does not exceed limit of selling price with a certainty that the limit of selling price is based on zone combination and year in accordance with what has been stated in Indonesian Minis ter’s regulation where the area is not less than 60 m².²

However, residence needs are really correlated with population growth which is more dense and the development of technology is also more advanced, particularly in urban area, where the land price is more expensive, hence, many urban people only has narrow land for their residence. The requirement of healthy house is not acceptable in a big city. One of the problems is the placement of septic tank in narrow land. According to Decree of Indonesian Minister of Settlement and Regional Infrastructure, one of the requirements of healthy house is that it must have healthy lavatory, which the main characteristic of healthy lavatory is that it does not incur smell, it makes beautiful view, and it does not cause a danger against health caused by faeces.(3)

The faeces reservoir is a hole in the ground. The shape could be varied and its depth is depended on the condition of the ground. Moreover, twin double model (cubluk kembar) is the most model used by the people and its advantages could be used forever, it is suitable
for all kinds of ground and high groundwater surface. However, its weakness is it needs larger land area. The faeces reservoir that is often used is septic tank shape because its advantages are cleaner, healthy, it does not cause pollution, it is not full too quickly, and it could be drained. Meanwhile, the weakness is it needs larger land area and it is more expensive.

Septic tank is a reservoir for wastewater and faeces. Some of people used conventional septic tank and the impact is the distance between the hole of infiltration reservoir and the groundwater is closer, which caused the pollution of groundwater. This pollution causes the several diseases such as diarrhea. Human faeces which contained Coliform bacteria could contaminate in 4-6 meters from the contamination source. Dug well construction also influenced the quality of microbiology in water. This is caused by the construction of dug well itself that does not qualify one of the improper requirements, which is the distance between dug well and septic tank is less than 10 meters and it is seen from septic tank construction and its infiltration really influences the content of Coliform bacteria.

The pollution of groundwater as the effect of disposed conventional septic tank could be prevented by the distance between septic tank infiltration and clean water source, hence, it needs large land so that it could reach the distance between clean water source and septic tank infiltration.

There has been a new innovation of disposed wastewater from septic tank with basic requirement that it does not pollute groundwater if it is minimal in 10 meters. Therefore, it is made a breakthrough in which it still implement basic principle that bacteria would be lost after passing or being in minimal 10 meters. Changing the bacteria which in the first time, bacteria ran horizontally in 10 meters, the researcher would change bacteria to run horizontally only in less than 2.5 m$^2$. Thus, it would minimize the size of land area for making lavatory and its wastewater treatment.

This research aimed at analyzing the design of feces waste treatment in household with narrow land area.

**MATERIAL AND METHOD**

The variables of this experimental were Coliform bacteria and turbidity of wastewater that passed the treatment design in the distance of 0, 5, 7, 9, 11, and 13 meters. The obtained data was processed, analyzed by using Anova.

**FINDINGS**

Feces waste treatment design in the household was made from PVC pipe with diameter of 4 Ø with length in 10 meters. PVC pipe was cut into 2 meters for 6 pieces and 1 piece was 1 meter. Connect the pipe as spiral shape and fill the pipe with quartz sand until full. The sand needed was around 200 kg. Length total of PVC pipe needed was 13 meters. Meanwhile, the land area needed in tooling of this wastewater treatment in household as the infiltration replacement by being planted to the ground and it needs area either horizontally or vertically in 3 m$^2$. Although the length of the pipe was 13 meters and due to being shaped in spiral, the land area needed by this design was not more than 3 m$^2$ horizontally. If it was planted vertically, it would be simpler in placing at home. This design of waste treatment was conditioned in almost similar with the running of bacteria in the ground in which the bacteria would pass the ground with porosity and ground pores depending on the condition of the ground in that area.

![Figure 1. Design of Feces Waste Treatment](image_url)
Table 1. Coliform bacteria and Turbidity

<table>
<thead>
<tr>
<th>Distance (meter)</th>
<th>Coliform Bacteria (colony/100 ml)</th>
<th>Turbidity (NTU)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td>0</td>
<td>620</td>
<td>660</td>
</tr>
<tr>
<td>5</td>
<td>510</td>
<td>540</td>
</tr>
<tr>
<td>7</td>
<td>460</td>
<td>480</td>
</tr>
<tr>
<td>9</td>
<td>320</td>
<td>360</td>
</tr>
<tr>
<td>11</td>
<td>110</td>
<td>150</td>
</tr>
<tr>
<td>13</td>
<td>70</td>
<td>80</td>
</tr>
</tbody>
</table>

Table 2. Reduction Coliform bacteria and Turbidity

<table>
<thead>
<tr>
<th>Distance (meter)</th>
<th>Coliform Bacteria (%)</th>
<th>Turbidity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
<td>Average</td>
</tr>
<tr>
<td>0-5</td>
<td>18.24</td>
<td>23.96</td>
</tr>
<tr>
<td>0-7</td>
<td>27.14</td>
<td>54.84</td>
</tr>
<tr>
<td>0-9</td>
<td>47.42</td>
<td>75.88</td>
</tr>
<tr>
<td>0-11</td>
<td>80.64</td>
<td>92.48</td>
</tr>
<tr>
<td>0-13</td>
<td>88.42</td>
<td>98.14</td>
</tr>
</tbody>
</table>

There was minimum one pair of average in reduction percentage either for Coliform bacteria or different turbidity, meanwhile LSD showed that there was a significant difference of reduction between Coliform bacteria and turbidity in domestic feces waste on the comparison of 0-5 with 0-7, 0-9, 0-11, 0-13 meters.

DISCUSSION

The result of examining Coliform bacteria and turbidity after passing simple infiltration design resulted significant data. The longer the distance, the Coliform bacteria and turbidity reduced are more and more. In the infiltration design, there is quartz sand that has the function as filter. The wastewater has high turbidity after passing sand media, then, the particle in it would be retained on the sand. Furthermore, this research is in accordance with the research conducted by Edwin, Satiyadi & Dewilda, who used andesite as a filter for well water that has very high total of Coliform in 1100 MPN/100 ml and turbidity in over 5 NTU. According to Indonesian Government’s Regulation, Number 82 2001 for class 1 of this well water is very improper for being used. After the well water is filtered by utilizing bio-sand, its result is bio-sand which is very effective to be used as filter.

In Indonesian Government’s Regulation, water resource in this regulation is water container that is on or under the ground surface, which are aquifer, water springs, river, marsh, lake, and estuary. Everyone is forbidden to dispose either solid waste or gas waste into the water and water resource. Every Indonesian citizens must manage their domestic waste. Winarni & Puspitasari explained that the pollution of ground water in Yogyakarta is still high. One of the obstacles as to why this pollution is still high is that the citizens have not been aware and understood well how to care septic tank. Second, they did not conduct technical guidance stated in Standar Nasional Indonesia (Indonesian National Standard) 03-2398, (2002) and there is an infiltration system and septic tank constructing that did not qualify. The ground pollution may also occur based on the ground types in the area and the condition of quite dense population, thus, the construction of infiltration could not be conducted. The other conclusion is the lack of government’s role in solving this groundwater pollution because there is no budget to solve this ground water. Besides, it is because there is no budget for chlorine diffuser and lack of control. Septic tank with infiltration system could not be done again recently. Moreover, it is undertaken in urban area that has dense population and narrow land area. There is a significant correlation between diarrhea and the lavatory owner. Factor of lavatory owner that must be appropriate with either regulation or law is really influenced by the factor of knowledge, education, economic status,
attitude, and role of health workers. Education level, knowledge, attitude, economic status, and the role of health workers that really supported someone to do good changes in attitude, behavior for having a healthy lavatory completed by septic tank and infiltration that has distance in accordance with the standard established and the water resource.\(^{(13)}\)\(^{(12)}\) If someone does not have any knowledge, this would not be realized. Lavatory constructing completed by septic tank and infiltration based on standard, is actually really correlated with economic status. Design of feces waste treatment in household for narrow land area as the replacement of infiltration made is quite simple. It only needs land area around 2.5 meter and it could be modeled either vertically or horizontally.

The reduction average of turbidity reached 98.14\% in the distance of 13 meters, meanwhile, the reduction percentage of Coliform bacteria until it reaches 80.64 \% in 11 meters and 88.42\% in 13 meters. The reduction of Coliform bacteria caused by Coliform bacteria flow together with the stream of incoming waste and passed pipe, which in the inside, there is quartz sand. According to Selintung & Syahrir, the research result at Faculty of Engineerig who studied quartz as the filter media obtained that Specific Gravity is in 2.678 and Uniformity Coefficient is in 1.912. The quartz sand that have Specific Gravity in 2.678 is qualified as filter media. However, if it is seen from Uniformity Coefficient, it did not qualify as a filter media based on Selintung & Syahrir.\(^{(13)}\) If Uniformity Coefficient is big, it shows that the size of its grain is also big. Thus, it could be stated that the ground that has big Uniformity Coefficient shows that this ground is coherence with Uniformity Coefficient >6. By looking at Uniformity Coefficient in less than 6 that is not uniform resulted the pores in the sand are not solid/ not tight. Thus, the porosity would be bigger. The speed of the domestic waste flow would be faster because of the magnitude of porosity from the sand.\(^{(14)}\)

Human sewage is a domestic waste that could cause several diseases, such as cholera, typhus, abdominal, dysentery, basilar, amoeba, and several kinds of worms. Moreover, these diseases are included in disease type caused by bacteria, protozoa, virus, and helmin. These diseases could infect human through water, hand, insects, rats media that touched food and drinks which are not managed well and in healthy manner. Therefore, in order to prevent the disease that could estinguish human, every human who produce domestic waste, particularly sewage/ human faeces, must be managed well and correctly and one of them is by having lavatory that is completed with septic tank and infiltration.

Liquid which is out from effluent of the septic tank is liquid that is accompanied by enteric microorganism in which mechanism of pollution pattern of wastewater in the ground, bacteriologically that bacteria would thrive and breed together with wastewater, which is as food for the bacteria. Moreover, the bacteria proliferated and could thrive for 5 meters. After 6 until 11 meters, the bacteria would undergo extinction/ death because many bacteria which proliferated are not accompanied by the total of food from the waste. In another words, all food are eaten. Thus, bacteria in the distance of over 11 meters would die. Therefore, the distance of pollution bacteriologically is in 11 meters from the source point of landfill or human sewage. This bacteriological pattern moved in accordance with the condition of normal ground horizontally to the ground flow.\(^{(15)}\)

The result obtained in 13 meters is the average is 70 colony/100 ml. This result is above standard settled by Minister of Health. In order to obtain the result of Coliform bacteria under 70 colony/100 ml, it is lengthened the flow path of domestic waste. The second step is the people could scours/ pulverize quartz sand to obtain uniformity coefficient. Hence, the pores in the sand are smaller and its porosity is also smaller.

**CONCLUSION**

Wastewater treatment design in household with narrow land area could significantly reduce Coliform bacteria and turbidity.

**Conflict of Interest, Funding and Ethical Clearance:** The authors state that there is no conflict of interest about this study. The funding of this study taken from the authors. Ethical clearance taken from Ethics Committee of Health Polytechnic of Ministry of Health in Surabaya.

**REFERENCES**

2. Kemenkeu. Regulation of the Minister of Finance No.115/PMK.03/2014 regarding the Fourth Amendment to Regulation of the Minister of Finance No.26/PMK.03/2007 concerning Limitation of Simple House, Pondok Boro, Student and Student Dormitory, and Other Housing. Jakarta, Indonesia; 2014.


Risk Factors at Home on Acute Respiratory Infection (ARI) Incidence in Children Under Five in Sapuli Island, South Sulawesi

Mulyadi¹, Heru Santoso Wahito Nugroho²

¹Health Polytechnic of Ministry of Health at Makassar, Indonesia; ²Health Polytechnic of Ministry of Health at Surabaya, Indonesia

ABSTRACT

One of the factors causing ARI is physical environment and maintenance of home environment. This study aimed to analyze the influence of risk factors in the house on the frequency of ARI in children under five in Sapuli island. This cross-sectional study was conducted on Sapuli Island, Pangkajene Kepulauan District from August to September 2017. The sample was 34 houses of children under five suffering from ARI, selected by total sampling. Data on smoking habits in the house, fuel type used, occupant density and condition of house ventilation were collected through interviews, while dust levels in the house were measured using a dust sampler. The collected data was described as a frequency, then analyzed using Chi-square test. The factors that have a relationship with the incidence of ARI in children under five in Sapuli Island were dust levels in the house, density of occupants and condition of ventilation in the house.

Keywords: Acute respiratory infection, Children children under five age, Dust levels, Density of occupants, House ventilation

INTRODUCTION

Acute respiratory infection (ARI) is the most common disease reported by health care facilities. The World Health Organization (WHO) estimates the incidence of ARI in developing countries with under-five mortality rates above 40 per 1000 live births is 15%-20% per year in under-fives.¹)

According to WHO, about 13 million children under five in the world die every year and most of these deaths occur in developing countries and ARI is one of the main causes of death by killing ± 4 million children under five each year.²) ISPA is an acute infection involving the upper respiratory tract and lower respiratory tract. This infection is caused by viruses, fungi or bacteria.

ISPA will attack the host when the immune system decreases. Children under five years old are groups that have immune systems that are still susceptible to various diseases.³) ARI is one of the main causes of patient visits at Public Health Center (40%-60%) and hospitals (15%-30%).³)

ARI begins with a fever accompanied by one or more symptoms: sore throat or pain for swallowing, runny nose, dry cough or cough with phlegm. The ARI prevalence period is calculated within the last 1 month. The Indonesian ARI prevalence period according to Riskesdas (Basic Health Research of Indonesia) 2013 is 25.0%. The highest population group with ARI is aged 1-4 years (25.8%). ARI is more experienced by the population with the lowest and lower middle ownership index.⁴)

One of the factors causing ARI is physical environment and maintenance of home environment. Maintenance of the home environment can be done by maintaining cleanliness in the house, arranging the exchange of air within the house, keeping the environment clean outside the home and to keep the
sunlight into the house during the day, and to prevent the densely populated.\(^{(5)}\)

The incidence of ARI in South Sulawesi Province fluctuates annually. The incidence of pneumonia in infants and toddlers in South Sulawesi Province in 2010 was 5/1000 infants and toddlers with CFR = 0.00059, in 2011 as many as 10.5 / 1000 infants and toddlers with CFR = 0.001. The incidence of cough in infants and toddlers who are not not pneumonia in 2010 = 30.5 / 100 babies and toddlers, in 2011 = 26.7 / 100 babies and toddlers.\(^{(6)}\),\(^{(7)}\)

The infant mortality rate in South Sulawesi Province in 2014 was 7.3 per 1000 live births. In 2010 and 2011 the Health Service Development Division, Health Office of Pangkajene Kepulauan District reported that ARI was in the first of 10 major diseases. In 2011 the morbidity rate decreased to 171,236. In 2012 the morbidity rate again increased to 225,752.\(^{(8)}\)

This study aimed to analyze the influence of risk factors in the house on the frequency of ARI in children under five in Sapuli island.

**MATERIALS AND METHOD**

This cross-sectional study was conducted on Sapuli Island, Pangkajene Kepulauan District from August to September 2017. The sample of this study was 34 houses of children under five suffering from ARI in the last 1-3 months, selected by total sampling technique. Data on smoking habits, fuel type, occupant density and home ventilation conditions were collected through interviews, while dust levels were measured using a dust sampler. The collected data was in categorical form, so analyzed descriptively in the form of frequency distribution.\(^{(9)}\) The hypothesis was tested using Chi-square test.

**FINDINGS**

**Table 1. Relationship of dust levels with the frequency of ARI incidence in children under five in Sapuli island, Pangkajene Kepulauan District, South Sulawesi Province, Indonesia**

<table>
<thead>
<tr>
<th>Dust Level</th>
<th>Frequency of ARI in children under five</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 3 Times</td>
<td>≥ 3 Times</td>
</tr>
<tr>
<td>Eligible</td>
<td>17</td>
<td>65.4</td>
</tr>
<tr>
<td>Not Eligible</td>
<td>1</td>
<td>12.5</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>50</td>
</tr>
</tbody>
</table>

p-value = 0.027

**Table 2. Relationship of house density with the frequency of ARI incidence in children under five in Sapuli island, Pangkajene Kepulauan District, South Sulawesi Province, Indonesia**

<table>
<thead>
<tr>
<th>Density of occupants</th>
<th>Frequency of ARI in children under five</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 3 Times</td>
<td>≥ 3 Times</td>
</tr>
<tr>
<td>Density</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Not Density</td>
<td>11</td>
<td>78.6</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>50</td>
</tr>
</tbody>
</table>

p-value = 0.0015
Table 3. Relationship of family members smoking in the house with the frequency of ARI incidence in children under five in Sapuli island, Pangkajene Kepulauan District, South Sulawesi Province, Indonesia

<table>
<thead>
<tr>
<th>Smoke</th>
<th>Frequency of ARI in children under five</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 3 Times</td>
<td>&gt; 3 Times</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Smoke</td>
<td>14</td>
<td>51.9</td>
</tr>
<tr>
<td>Not smoke</td>
<td>3</td>
<td>42.9</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>50</td>
</tr>
</tbody>
</table>

p-value = 1.000

Table 4. Relationship of type of fuel used with the frequency of ARI incidence in children under five in Sapuli island, Pangkajene Kepulauan District, South Sulawesi Province, Indonesia

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Frequency of ARI</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 3 Times</td>
<td>&gt; 3 Times</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Gas/LPG</td>
<td>17</td>
<td>51.5</td>
</tr>
<tr>
<td>Not Gas/LPG</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>50</td>
</tr>
</tbody>
</table>

p-value = 1.000

Table 5. Relationship of house ventilation with the frequency of ARI incidence in children under five in Sapuli island, Pangkajene Kepulauan District, South Sulawesi Province, Indonesia

<table>
<thead>
<tr>
<th>Ventilation</th>
<th>Frequency of ARI in children under five</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 3 Times</td>
<td>&gt; 3 Times</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Eligible</td>
<td>13</td>
<td>81.2</td>
</tr>
<tr>
<td>Not Eligible</td>
<td>4</td>
<td>22.2</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>50</td>
</tr>
</tbody>
</table>

p-value = 0.002

**DISCUSSION**

Uncomplicated dust levels in the home of children under five suffering from ARI they live in houses on stilts with ground floor or not soil but dirty and dusty. Eligible flooring is dry, not moist and made of waterproof material, easy to clean and does not produce dust. There is a relationship between home sanitation conditions with ARI incidence in children under five, in this case, dust is one type of pollutant that can cause health problems in humans. The results showed that the level of dust in the house associated with the frequency of ARI in children under five. Pollution inside homes with concentrations exceeding normal can damage pulmonary defense mechanisms and cause ARI, so first-level prevention efforts need to be done i.e handling pollution inside and outside the home. WHO states that the incidence of ARI varies according to several factors, namely:
environmental conditions (eg, home hygiene, air pollutants and others). This is also supported by the ventilation condition of 76.5% of ARI sufferers’ homes is not eligible for health.

ARI prevention can be done by maintaining the environment around the house, meet and improve the fulfillment of nutrition and immunization. ARI is a forgotten childhood killer disease (unicef). Increased incidence of ARI is caused by several factors: LBW, air pollution, inadequate ventilation density, child membedong, inadequate breastfeeding, insufficient immunization, under-nutrition, and early supplementary feeding.

The results showed that there was a density of home occupants related to the frequency of ARI in children under five. WHO states that ARI is related to the number of family members who occupy a house too much compared to the house area. Regulation of Health Minister of Indonesia, Number 829 / MENKES / SK / VII / 1999 on Home Health Requirements states that in a house, the minimum area for one family member is 8 square meters.

The results show that the condition of home ventilation is related to the frequency of ARI events. The purpose of home ventilation is to maintain good indoor air quality, ie to ensure that air in the safe space to support healthy breathing. A portion of the ARI can be transmitted by airborne, so transmission in this way should be watched and mitigated by removing airborne contaminants, one of which is through natural ventilation.

Trisnawati and Khasanah reported that intrinsic and extrinsic factors affecting ARI in young children include: home conditions, which include house ventilation and smoking habits within the home.

The unsuitable home ventilation is due to the small house type and narrow land ownership. House ventilation is generally only on the front of the house. Meanwhile, the side of the house is already coincide with the wall of a neighbor’s house. Home ventilation is related to the humidity of the house, which supports the chances of living viruses and bacteria. Sunlight can kill bacteria or viruses, so with adequate lighting ARI events can be reduced. Kreiger and Higgins suggest that poor ventilation can harm health, especially the respiratory tract.

CONCLUSIONS

The factors that have a relationship with the incidence of ARI in children under five in Sapuli Island are dust levels, density of occupants and ventilation of the house.

Conflict-of-Interest Statement: The authors of this study declare that there is no conflict of interest related to this research.

Source of Funding: All funds used to support this study comes from the researchers/ authors themselves.

Ethical Clearance: Ethical clearance taken from Ethics Committee of Institute of Health Polytechnic of Ministry of Health in Makassar, Indonesia.

REFERENCES


Relation between Underutilization of Antenatal Care and Birth Outcome

Bushra M Majeed¹, Ruqiya S Tawfeek², Nabila K Yaaqoub³

¹Assistant Professor, Department of Obstetrics and Gynecology, University of Baghdad, Al-Kindy College of Medicine, ²Assistant Professor, Department of Community Medicine, Al-Iraqia University – College of Medicine, ³Assistant Professor, Obstetrics and Gynecology Department – Tikrit University - College of Medicine

ABSTRACT

In this study, a descriptive study was applied during the period from January to December 2017 about underutilization of antenatal care for the pregnant. About 198 pregnant women who were attending AL Nomaan teaching hospital during the study period excluding pregnant women who had risk factors that interfere with pregnancy outcome. Data collection was including the following: age, residence and occupation also information regarding antenatal visits Birth weight and preterm delivery were identified as pregnancy outcome. Among the delivered babies it was revealed that 70.7% of them were classified as favorable birth outcome, while 29.29% as being unfavorable birth outcome which was including low birth weight, preterm delivery and stillbirth which were 68.97%, 29.31% and 1% respectively. The relation between body mass index of pregnant women and birth outcome by T-test was found that there was a highly significant effect of BMI and birth outcome. Also, it was found that there was a significant relation between pregnancy spacing and birth outcome.

Keywords: Antenatal Care, Birth Determinants, Convenient Sampling, Favorable and Unfavorable Birth Outcomes, T-test

INTRODUCTION

Pregnancy consequences are influenced by many issues such as age, occupation, smoking, alcohol drinking, coffee drinking, stress and physical action¹. Nutrition supplements are important health determinants affecting pregnancy outcomes². Iron and folic acid are important to normal pregnancy outcomes. Low serum folate is expressively correlate with increased risk of neural tube defects, preterm birth and low birth weight¹. Some studies stated the increased risk of preterm delivery between underweight women⁴, while others found augmented risk in obese women⁵. Low birth weight leads to increased risk of infant death and weakened development⁶. Woman with increased age was autonomously related with cesarean delivery, preterm labor and low birth weight but it is unclear whether this association affected by parity and trial of labor⁷,⁸,⁹.

Stress associated with woman occupation can affect pregnancy outcomes and management of stress is important as it may lead to reduce nutrient intakes¹⁰,¹¹. Preterm delivery before 37 completed weeks is a major contributor to infant illness and death¹². Preterm birth and low birth weight regarded as indirect cause of neonatal death¹³. Low birth weight and preterm delivery were related with increased neonatal morbidity and mortality along with likely progressive problems in childhood and risk of numerous diseases involving depression and psychiatric circumstances in parenthood¹⁴. More than two million infants worldwide die before birth and most of these stillbirths in developing countries¹⁵.

The goal of this paper is to identify some risk factors affecting the achievement of favorable birth outcome. Namely, to describe the sociodemographic background of the study subjects including maternal age, occupation, occupation, identify the effect of antenatal care on birth outcome and lastly classify the effect of Birth spacing and medical and family history on birth outcome.

SUBJECTS AND METHOD

A Descriptive study was applied during the period
from January to December 2017 to achieve study objectives. Non probability (Convenient) sampling designed was carried including 198 (37 primigravida and 161 multigravida) and pregnant women who were attending Al-Nomaan teaching hospital during the study period exclude pregnant women who had risk factors that interfere with pregnancy outcome.

Data collection by researches was including the following data: age, residence and occupation also information regarding antenatal visits which was depends on (Antenatal card) as a document of this and was classified as adequate visits when the pregnant women achieved at least 7 visits, while inadequate visits when she achieves 4-6 visits and no care when the number of visits less than 4. Information about Birth spacing (2 years between age of last baby and time of current pregnancy) also was carried out. Birth weight (weight of newborn less than 2500 gram) and preterm delivery (delivery before 37 weeks of gestation ) were identified as pregnancy outcome.

**RESULTS**

During the 12 months study period, birth outcomes for new born babies were studied to classify these newborns as having favorable and unfavorable birth outcome. Among the delivered babies it was revealed that 140(70.7%) of them were classified as favorable birth outcome, while 58(29.29%) as being unfavorable birth outcome as shown in Fig.1.

![Figure (1) rate of favorable and unfavorable birth outcome of study population](image)

The unfavorable birth outcome was including low birth weight preterm delivery and stillbirth which were 68.97%, 29.31% and 1% respectively as shown in Fig. 2.

![Figure (2) Types of unfavorable outcome](image)

About relation between both groups (with favorable outcome and unfavorable outcome), there was no significant difference by applying T-test through which P value more than 0.05 regarding the mean age of both groups. Chi-square test was applied to study the relation between both groups regarding residence and mother work. It was found that there was a noteworthy influence of these factors on birth outcome for p< 0.05. Study of relation between the mean of body mass index of antenatal women and birth outcome by T-test revealed that there was a highly significant effect of BMI and birth outcome as demonstrating in Table (1).

### Table (1) Distribution of study population according to birth outcome in relation to some variable

<table>
<thead>
<tr>
<th></th>
<th>Favorable</th>
<th>Unfavorable</th>
<th>Statistical test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate antenatal care</td>
<td>55</td>
<td>10</td>
<td>X²=9.64</td>
</tr>
<tr>
<td>Inadequate antenatal care</td>
<td>70</td>
<td>37</td>
<td>Df=2</td>
</tr>
<tr>
<td>No antenatal care</td>
<td>15</td>
<td>11</td>
<td>P&lt;0.008</td>
</tr>
</tbody>
</table>

The current study revealed the association between birth spacing and birth outcome from a 161 women who had a birth space (after exclusion of 37 primigravida) less than 2 years was 119 and more than 2 years was 43 and by applying Chi-square test it was found that there was a significant relation between spacing and birth outcome as in Table (2).
Table (2): Relation between birth spacing and birth outcome

<table>
<thead>
<tr>
<th>item</th>
<th>favorable</th>
<th>Unfavorable</th>
<th>Statistical test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Mean Age</td>
<td>29.3±4.5</td>
<td>28.76±5.2</td>
<td>T-test=0.69 p&gt; 0.05 Non sig.</td>
</tr>
<tr>
<td>2- Residence:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>91</td>
<td>17</td>
<td>X²=21.068 Df=1 P &lt; 0.005 Sig.</td>
</tr>
<tr>
<td>Rural</td>
<td>49</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>3- Occupation:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>95</td>
<td>27</td>
<td>X²=7.87 Df=1 P &lt; 0.005 Non sig.</td>
</tr>
<tr>
<td>Employed</td>
<td>45</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>4- Mean BMI</td>
<td>21.24±2.03</td>
<td>22.36±3.85</td>
<td>T-test=2.0981 Df=196 P &lt; 0.05 Sig.</td>
</tr>
</tbody>
</table>

From Table (3), it was found that utilization of antenatal care services and birth outcome according to the type of this utilization (adequate, inadequate and no care) was a significant relation between them by applying Chi-square test as in Table (3).

Table (3) Distribution of study population and birth outcome based on the type of antenatal care

<table>
<thead>
<tr>
<th></th>
<th>No. favorable birth outcome</th>
<th>No. Unfavorable birth outcome</th>
<th>Statistical test</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2 years</td>
<td>68</td>
<td>29</td>
<td>X² =4.927 Df=1 P &lt;0.026 sig.</td>
</tr>
<tr>
<td>&gt; 2 years</td>
<td>51</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>43</td>
<td></td>
</tr>
</tbody>
</table>

In order to identify the causes of inadequate antenatal care or no care, the following table demonstrate the causes of underutilization of primary healthcare services that delivered to pregnant women and had unfavorable outcome due to poor satisfaction which stand for 29.31% of them. About 28.57% among women who had favorable outcome but difficult to reach to primary health care center for both groups were as 15% and 10.34% respectively. Late attendance for antenatal care was account 14.28% for women with favorable outcome while it was 10.34% regarding their mother home work as a cause for poor antenatal care that were 14.28% and 13.79% for women with favorable outcome and women with unfavorable outcome respectively. All these findings were shown in Table (4).
Table (4) Distribution of favorable and unfavorable outcome according to causes of poor utilization of antenatal care

<table>
<thead>
<tr>
<th>Causes</th>
<th>No. of favorable birth outcome</th>
<th>Percent</th>
<th>No. of Unfavorable birth outcome</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult to reach PHC</td>
<td>21</td>
<td>15%</td>
<td>6</td>
<td>10.34%</td>
</tr>
<tr>
<td>Busy with home work</td>
<td>20</td>
<td>14.28%</td>
<td>8</td>
<td>13.79%</td>
</tr>
<tr>
<td>Visit private sector</td>
<td>39</td>
<td>27.85%</td>
<td>15</td>
<td>25.86%</td>
</tr>
<tr>
<td>Poor satisfaction with ANC</td>
<td>40</td>
<td>28.57%</td>
<td>17</td>
<td>29.31%</td>
</tr>
<tr>
<td>ANC start in 4th month</td>
<td>20</td>
<td>14.28%</td>
<td>12</td>
<td>20.68%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>140</strong></td>
<td><strong>100%</strong></td>
<td><strong>58</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**DISCUSSIONS**

The intention of this research was to inspect the elements influencing birth weight and gestational age and to promote more favorable pregnancy outcomes. For relation between both groups (with favorable outcome and un favorable outcome), there was no significant difference by applying T-test through which P value more than 0.05 regarding the mean age of both groups. While by applying Chi-square test to study the relation between both groups regarding residence and mother work, it was found that there was a significant effect these factors on birth outcome of p< 0.05.

Study of relation between the mean of body mass index of pregnant women and birth outcome by T-test was revealed that there was a highly significant effect of BMI and birth outcome. This result is in agreement with previous studies which reported the high rates of preterm and low birth weight in obese woman 16, 17. The current study revealed the association between birth spacing and birth outcome from a 161 women who had a birth space (after exclusion of 37 primigravida) less than 2 years was 119 and more than 2 years was 43. By applying Chi-square test, it was found that there was a significant relation between spacing and birth outcome. These results indicate that inadequate prenatal care cause high incidence of adverse pregnancy outcomes which agree with other studies in 18, 19, 20. They found short pregnancy intervals associated with low birth weight and other adverse pregnancy outcomes. In order to identify the causes of inadequate antenatal care or no care, table (4) demonstrate the causes of underutilization of primary healthcare services that delivered to pregnant women, who had unfavorable outcome owing to poor satisfaction which was 29.31% of them and 28.57% among women who had favorable outcome but difficult to reach primary health care center for both group were as 15% and 10.34% respectively. Late attendance for antenatal care was 14.28% for women with favorable outcome while it was 10.34% regarding their mother home work as a cause for poor antenatal care with 14.28% and 13.79% for women with favorable outcome and women with unfavorable outcome respectively, that because they are depend on their past pregnancy experience 21. It was found that utilization of antenatal care services and birth outcome according to the type of this utilization (adequate ,inadequate and no care) was a noteworthy relation between them 22. Good quality of antenatal care can improve birth outcomes by preventive measures and delivery in health centers where complications can be managed 15.

**CONCLUSIONS**

Pre-birth care, a pregnancy-related service given to pregnant women by health professionals, is amid the foremost involvements that intend to avoid neonatal deaths and sustain the healthiness of women throughout pregnancy. An expressive study was applied during the period from January to December 2017 to identify some risk factors affecting the achievement of favorable birth outcome. The relation between utilization of antenatal care services and birth outcome according to the type of this utilization (adequate, inadequate and no care) was a major relation between them. Accordingly, it was found that unfavorable birth outcome was due to poor antenatal care, abnormal body mass index short spacing between deliveries.

**Ethical Clearance:** Taken from AL Nomaan teaching hospital committee

**Source of Funding:** Self Funding
Conflict of Interest: The authors don’t have any conflict of interest for this study

REFERENCES


Bacteriological Profile of Wound Infections in MRSA and ESBL Detection in E.Coli & Klebsiella

Suresh P¹, P Vamsimuni Krishna¹, V Praveen Kumar¹, Sreenivasulu Reddy²

¹PH.D Scholar Bharath University Thambram, Chennai, ²Professor, Department of Microbiology, Srilaxmi Narayana Institute of Medical Sciences (SLIMS) Osudu, Puducherry, India

ABSTRACT

Background: Recent trends in Extended spectrum β-lactamase(ESBL)& MR Producing bacterial pathogen causes various life threatening infections lead to sepsis related Mortality. The ESBLs can makes the infection caused by the bacteria much harder to treat. Method: pus Aspiration taken from various anatomical sites of wound area was collected using sterile swab under aseptic Conditions and further processed by doing Grams stain and culture. Culture was done on Blood agar, Brain Heart Infusion agar, Mac Conkeys agar, incubated at 37⁰c for 24hrs. Isolates confirmed by biochemical tests, antibiotic susceptibility testing was done using muller Hinton agar by Kirby Bauer’s method as per standard CLSI guidelines. Results: out of 396 pus samples, 236 were culture positive. Most common organisms isolated was MRSA (34.3%) followed by MRCons & Other isolates included were, ESBL E.coli, ESBL Klebsiella. and Pseudomonas. Conclusion: Present study observed bacteria causing wound infection. High Percentage of bacterial growth were seen in samples drawn from surgery wards and dialasis ward, labour ward followed by orthopedics. S.aureus (34.3%)was the predominant isolated followed by MRCoNS (15.8%), E.coli(10.5%). MRSA incidence in our study was 10% and ESBL’s detected in 20% of E.coli strains and 6.6% Klebsiella strains.

Keywords: Wound infection, Pus, MRSA, ESBL E.coli & Klebsiella.

INTRODUCTION

Wound infection could result in prolonged hospital stay, increase trauma care, and high treatment costs if not properly attended to Gram negative bacteria have been reported to be the major etiologies of wound infections.¹ Extended spectrum β-Lactamases (ESBL) are enzymes produced by pathogens belonging to Enterobacteriaceae, most commonly Escherichia coli and Klebsiella pneumonia.²

The potential for infection depends on a number of patients variables such as the state of hydration nutrition and existing medical conditions as well as extrinsic factors such as pre, intra and post operative care if the patient has undergone surgery. Thus it is difficult to predict which wound will become infected.³ The overall incidence of wound sepsis in India is from 10-33%. Relative resistance to antibiotics relatively more virulent strains and capacity to adapt quickly to changing environment make the pathogens acquired in hospitals a matter of concern.³

Wound infection is one of the most common hospital acquired infections and important cause of morbidity and accounts for 70-80%.⁴ The importance of wound infections in both economic g in serial human terms, should not be underestimated. A study on an average, patients with wound infections stays about 6-10days more in hospital than if wound had heel without infections.⁶ This additional stay doubles the hospital cost. Wound infections can be caused by different groups of microorganisms, most commonly isolated aerobic microorganisms includes S.aureus,CoNs, Enterococci, E.coli, Paeurginosa, Klebsiella pneumoniae, Enterobacter, P.mirabilis, other streptococci, Candida, Acinetobacter.⁷

Corresponding author:
Suresh P
PH.D Scholar Bharath University Thambram, Chennai
Email: sureshraja25@gmail.com
MATERIALS AND METHOD

The study was done over a period of time of 1 year from Nov 2015 to Dec 2016. A total of randomly selected 396 samples received by bacteriology section of microbiology department from various department of SRLIMS Osudu hospital were processed. Pus samples were collected with sterile syringes & disposable cotton swabs and immediately inoculated onto Blood agar & Mac Conkey's agar media and incubated at 37°C for 24 hrs. After incubation, identification of bacteria from positive cultures was done with standard a microbiological technique which includes AES(Vitec-II Campact) Grams stain, biochemical reactions.

The antibiotic sensitivity testing of all isolates was performed by modified Kirby Bauers disc diffusion method on Muller hinton agar using antibiotics of Hi media as per the CLSI guidelines.

MRSA was detected using cefoxitin disk(30µg) according to CLSI guidelines. ESBL was detected using ceftazidime (30µg) as indicator drug by disc diffusion as per CLSI guidelines as a screening method and confirmation was done by phenotypic disc confirmatory test using Ceftazidime (30µg) and Ceftazidime/clavulanic acid combination disk(20µg/10µg). Klebsiella ESBL ATCC (700603) as a positive control and E.coli non ESBL strain ATCC 25922 as a negative control were used.

RESULTS

A total of 396 samples received by the laboratory of which, 137 were from different wards and 76 from OPD, were randomly selected for study. Out of 238 samples 137 showed aerobic growth & 106 remained sterile even after 48hrs incubation. High rate of bacterial growth was seen in sample collected from surgical wards followed by orthopedics. (Table 1). Majority of wound were infected with single organism. Gram positive cocci 64% and Gram negative bacilli 36%. Most frequently isolated organism was S.aureus 81(34.3%) followed by Staph.epidermidis, other isolates included Enterococci, E.coli, Klebsiella, Pseudomonas, and Proteus spp. (Table 2) 8 were MRSA out of 81 Staph.aureus strains. ESBL were reported 13 E. coli and 4 Klebsiella strains.

<table>
<thead>
<tr>
<th>SURGICAL</th>
<th>MEDICAL</th>
<th>OTHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARD</td>
<td>NO</td>
<td>%</td>
</tr>
<tr>
<td>GSW</td>
<td>117</td>
<td>39.3%</td>
</tr>
<tr>
<td>GOW</td>
<td>48</td>
<td>15.4%</td>
</tr>
<tr>
<td>GENT</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Ward wise distribution of samples

<table>
<thead>
<tr>
<th>ISOLATES</th>
<th>Total No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.aureus</td>
<td>81</td>
<td>34</td>
</tr>
<tr>
<td>Cons</td>
<td>44</td>
<td>18.6</td>
</tr>
<tr>
<td>E.coli</td>
<td>25</td>
<td>10.5</td>
</tr>
<tr>
<td>Klebsiella spp</td>
<td>15</td>
<td>6.3</td>
</tr>
<tr>
<td>Paureginosa</td>
<td>8</td>
<td>3.3</td>
</tr>
<tr>
<td>Acinetobacter</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Name & number of the organism isolated
Table 3: Antibiogram of wound infection.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the antibiotic</th>
<th>S.aureus</th>
<th>CoNS</th>
<th>E.coli</th>
<th>klebsiella</th>
<th>pseudomonas</th>
<th>acinetobacter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>penicillin</td>
<td>1</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>gentamicin</td>
<td>28</td>
<td>13</td>
<td>6</td>
<td>8</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>cotimoxazole</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Cefuroxime</td>
<td>4</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Erythromycin</td>
<td>37</td>
<td>26</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>Vancomycin</td>
<td>29</td>
<td>14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7.</td>
<td>Cefoxitin</td>
<td>8</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8.</td>
<td>Ampicillin</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9.</td>
<td>Amikacin</td>
<td>66</td>
<td>40</td>
<td>12</td>
<td>15</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>10.</td>
<td>Cefotaxime</td>
<td>33</td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>11.</td>
<td>Piercillin-tazobactum</td>
<td>41</td>
<td>19</td>
<td>15</td>
<td>20</td>
<td>19</td>
<td>-</td>
</tr>
<tr>
<td>12.</td>
<td>Ciprofloxy/levoflox/lomefox</td>
<td>15</td>
<td>11</td>
<td>5</td>
<td>11</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>13.</td>
<td>Amoxy-clav</td>
<td>43</td>
<td>36</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>14.</td>
<td>Caz</td>
<td>16</td>
<td>12</td>
<td>8</td>
<td>2</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>15.</td>
<td>Imipenem</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>16.</td>
<td>Cephlexin</td>
<td>4</td>
<td>2</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
</tbody>
</table>

**DISCUSSION**

As wound infection is becoming the major hospital acquired infection, hospital environment plays a major role for causing wound infection. In the our study, 58% of pus samples showed bacterial growth with 9 different bacterial species and the most common isolate was MRSA(34.3%) followed by MRCoNS (28.6%) and E.coli (10.5%). It correlated with the study conducted by Tapan at Navoday Medical college, Raichur who also reported S.aureus (27.5%) as the most common isolate followed by CONS (8.5%). In a similar study conducted at Kathmandu model hospital, 50% of Pus samples showed bacterial growth with 15 different species and the most common isolate was S.aureus (41.31%) followed by E.coli (20.89%) CoNS (15.44%). Similar study was conducted in TUTH showed 82.5% bacterial growth and 13 different bacterial species of which S.aureus was predominant (57.7%) followed by E.coli (11%) and CoNS (3%).

Similar studies conducted at Dhiraj general hospital, Sri Ramchandra medical college and at Namakkal showed S.aureus as predominant isolate.

In our study most of the Enterobacteriaceae members and Pseudomonas were susceptible to Amakicin, 3rd generation Cephalosporins and Pipercillin with Tazobactam in case of gram positive bacteria the highly effective antibiotics were Oxacillin, Erythromycin, Vancomycin, amoxy-clav least effective antibiotics were Penicillin & Cephalexin.

The incidence of methicillin-resistant S.aureus in our study was 8(10%). This finding is in agreement with the reported incidence of 10% MRSA in a study which was conducted by Agarwal and Khanna. A similar study conducted by Gaythree naik at kasturba medical college,Mangalore showed an incidence of 9.6% in our study ESBL were reported in 5 strains of E.coli (20%) & 1 strain of Klebsiella(6.6%)
CONCLUSION

This study revealed the presence of wound infection causing bacteria. High rates of bacterial growth were seen in samples collected from surgery wards followed by Dermatology. *S.aureus* (34.3%) was the predominant isolated followed by CoNS (15.8%), *E.coli* (10.5%). MRSA incidence in our study was 10% and ESBL’s detected in 20% I strains and 6.6% *Klebsiella* strains. Due to increased morbidity and mortality which are associated with these drug resistant organisms an early detection and intervention is a prerequisite in surgical patients. The government should take proactive steps in setting up hospital antibiotic policy guidelines in instituting hand washing among health care personnel. Hospitals should screen MRSA among their staff and treat those who are affected.

Ethical Clearance- Taken from SRILAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES, Institutional Ethics Committee(Human Studies) Ref.no. IEC/C-p/49/2014.

Source of Funding- Nil

Conflict of Interest - Nil

REFERENCES

2. Dr.Karia JB, Dr Gadekar HB, Dr Lakhani SJ. Study of bacterial profile of pus culture in Dhiraj general Hospital. Accessed from net
12. Anbumani N, Klyen J, Mallika M. Epidemiology and microbiology of wound infections. Indian Journal for the Practicing doctor 2006;3(5);pgno
The Risk Factors of Hepatitis B in Pregnant Woman in Banjarmasin on August – October Period 2017

Melani¹, Zairin Noor Helmi², Husaini³, Roselina Panghiyangani², Eko Suhartono²

¹Master of Public Health Science, Faculty of Medicine, ²Faculty of Medicine, ³Public Health Study Program, Faculty of Medicine, Lambung Mangkurat University

ABSTRACT

Hepatitis B is one of the top 3 infectious diseases in the world. Kalimantan Selatan is a province included in 13 provinces of Indonesia that have a prevalence rate above the national average of 1.4%. The purpose of this study was to determine the risk factors of Hepatitis B in pregnant women conducted in Banjarmasin, Kalimantan Selatan on August - October 2017 from secondary data 2,837 pregnant women population with the case-control approach. Risk factors recorded in form 9B (register of pregnant women who performed early detection of Hepatitis B) were analyzed. From 7 of risk factors were analyzed only vaccination history that influenced the incidence of hepatitis B in pregnant women (p 0.000, OR 0.321).

Keywords: hepatitis B, pregnant women, risk factors

INTRODUCTION

Hepatitis is an infectious disease that is a public health problem, which affects morbidity, mortality, public health status, life expectancy and other socio-economic impacts. Kalimantan Selatan is province included in 13 provinces with prevalence rates above the national average of 1.4%.¹ Transmission of hepatitis B virus (HBV) through contact with blood, semen and other body fluids such as wound exudate, secretion of saliva from patients who anchor the infection of Hepatitis B.² Prevalence of HBsAg was higher in pregnant women compared with health workers in the Sana’a Hospital, Yemen ie 54/543 (9.9%) and 19/546 (3.5%).³

Vertical transmission from mother to child is the main way of transmission of HBV in many countries in the world, especially in developing countries with high prevalence, and this is the reservoir for horizontal spread of HBV infection. Without prophylaxis, 80% - 90% of infants born from mothers with HBsAg and HBeAg will have chronic hepatitis B, cirrhosis and hepatocellular carcinoma.⁴

Various factors affecting the prevalence of Hepatitis B in pregnant women include age, working as a health workforce, history of blood transfusion, history of hemodialysis, history of hepatitis B vaccination, number of sexual partners and family history of hepatitis.⁵,⁶,⁷

MATERIALS AND METHOD

This research uses a case-control study on 2837 data population of pregnant women were screened for Hepatitis B in Banjarmasin from August to October 2017 that noted in the registration form in pregnant women who had early detection of Hepatitis B (9B Form). Method of data sampling with purposive sampling technique as much as 36 and control sampling from data of pregnant women-HBsAg nonreactive with systematic random sampling counted 36.

DOI Number: 10.5958/0976-5506.2018.00554.5

Corresponding author:

Melani
Master of Public Health Science, Faculty of Medicine, Lambung Mangkurat University, Jalan A. Yani, Km.36, Banjarbaru, Kalimantan Selatan, Indonesia,
E-mail: melani_dr@yahoo.com
RESULTS AND DISCUSSION

Table 1. Bivariate Analysis of Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>HBsAg</th>
<th>p-value</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Reactive</td>
<td>Non-reactive</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Adult</td>
<td>24</td>
<td>19</td>
<td>0.336</td>
</tr>
<tr>
<td></td>
<td>Youth</td>
<td>12</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Occupancy</td>
<td>Workforce</td>
<td>0</td>
<td>3</td>
<td>0.239</td>
</tr>
<tr>
<td></td>
<td>Non-workforce</td>
<td>36</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Transfusion</td>
<td>Yes</td>
<td>0</td>
<td>5</td>
<td>0.054</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>36</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>Yes</td>
<td>0</td>
<td>2</td>
<td>0.493</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>36</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>History of Hepatitis B Vaccination</td>
<td>Yes</td>
<td>0</td>
<td>19</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>36</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Family History of Hepatitis B</td>
<td>Yes</td>
<td>2</td>
<td>2</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>34</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Sexual Partners</td>
<td>&gt;1</td>
<td>2</td>
<td>0</td>
<td>0.493</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>34</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

The result of the research on the sample of 72 pregnant women, obtained the frequency distribution of pregnant women’s characteristics of age category dominated by an adult of 59.7% and youth of 40.3%. Pregnant women who work not as health workforce dominate 95.8% and pregnant women who work as health workforce of 4.2%. Pregnant women with no history of blood transfusion dominated 93.1% and those with a blood transfusion history of 6.9%. Pregnant women with no history of hemodialysis dominated 97.2% and who had a hemodialysis history of 2.8%. Pregnant women with no family history of hepatitis B dominated 94.4% and had a family history of hepatitis B of 5.6%. Pregnant women with no history of Hepatitis B vaccination dominated 73.6% and those with a history of Hepatitis B vaccination by 26.4%. Pregnant women who had the number of sexual partners > 1 dominated 97.2% and pregnant women who had sexual partners > 1 couple by 2.8%. From bivariate analysis with Chi-Square test only the history of Hepatitis B vaccinations that affect the incidence of Hepatitis B in pregnant women (p-value 0.000; 95% CI; OR 0.321).

In this study, age did not affect the incidence of hepatitis B in pregnant women (p-value 0.336 > 0.05). There is no difference in risk between adolescents and adults for HBV infection, this is in line with the study Trisnaningtyas et al, that there is no study that states there is a relationship between age and magnitude of Hepatitis B infest infant. The phenomenon that occurs in pregnant women in Banjarmasin caused by the nutritional status of pregnant women so although adult levels of Anti-HBs have been reduced, the body is still able to protect itself because it has a strong body resistance against HBV infection. Conversely less nutritional status leads to susceptibility to viral infections of any kind including HBV because it has low cellular immunity so that immune responses and immunologic memory have not been fully developed.

From the result analysis, there is no relation between work as health workforce on the incidence of Hepatitis B (p-value 0.239 > 0.05), description of pregnant women’s characteristics based on work the majority of pregnant women. The decrease in the incidence of Hepatitis B in health workforce is closely linked with increased knowledge of them about HBV transmission, hepatitis B vaccination and the adoption of standardized operational procedures and awareness based on transmission in improved health services. The incidence of HBV
infection in low-density care workers in the population who routinely vaccinates, HBV transmission from the health care provider to the patient is rare whereas the risk of transmitting HBV is positive from the patient to the healthcare provider is higher. The risk of transmission of HBV through the sharpening of sharps (infected with HBeAg positive patients) is estimated to be 1:3. Although HBV is highly infectious there are only 24 cases of work-related transmission from sharps injuries reported in Germany during 2013. This small number may be related to the high percentage of health workers vaccinated against Hepatitis B.10

There was no effect of blood transfusion history on the incidence of Hepatitis B, 100% of pregnant women with reactive HBsAg had no history of blood transfusion. The characteristics of pregnant women based on the history of blood transfusion, the majority of pregnant women who performed early detection of hepatitis B in Banjarmasin did not have a history of blood transfusion. Pregnant women with a blood transfusion history of 5 (6.9%) and all (100%) had non-reactive HBsAg results. Pregnant women with HBsAg reactive everything (100%) have no history of ever blood transfusion. Several studies reported HBV transmission through the blood component of an asymptomatic individual Hepatitis B.11,12 Blood donors or organs with HBsAg (-) screening tests may still contain HBV, so that a recipient who receives blood transfusions or organs from a non-reactive HBsAg screening donor will suffer post-transfusion Hepatitis, this is due to the window period or recovery or post-infection HBsAg examination results will be negative but still contain HBV (13). One of the causes of the absence of Hepatitis B post-transfusion because it is now a good blood donor screening strategy at PMI. In addition to HBsAg examination is also done another routine so that blood donor acceptance is more selective against HBV and another blood-borne virus (BBV).14,15

All pregnant women with reactive HBsAg (100%) had no history of hemodialysis and all pregnant women with a history of hemodialysis (100%) had nonreactive HBsAg results, the facts that occurred in pregnant women in Banjarmasin. When some patients receive concurrent dialysis, there is a recurring opportunity for patient-to-patient transmission, directly or indirectly through contaminated equipment, equipment, and equipment, or through officer hands, increasing their chances of exposure to nosocomial infections such as HBV infection.16,17 This phenomenon describes the transmission of the blood-borne virus in Banjarmasin does not occur through hemodialysis because the process of implementing the therapy in accordance with standard operating procedures have been established. From an investigator conducted in Tunisia, the implementation of hemodialysis in accordance with the standard operating procedure and work instructions also reduced the prevalence of Hepatitis B and Hepatitis C in hemodialysis patients.18

Majority of pregnant women who did early detection of hepatitis B in Banjarmasin did not have a history of Hepatitis B vaccination as many as 53 people (73.6%) from 72 people. There is an influence of the history of vaccination against the incidence of Hepatitis B (p-value, 0.000 <0.05; OR 0.321), this analysis showed Hepatitis B vaccination is protecting against Hepatitis B virus infection of 0.321 times. The results of this study are in line with several studies conducted in several other countries that get Hepatitis B vaccination can reduce the prevalence of Hepatitis B patients by 90-95%. The prevalence of hepatitis B decreased in US children, declining in the age range 6-19 years from 1.9 % to 0.6%; p <0.01.19 In Egypt, the implementation of hepatitis B vaccination in national in infancy produces adequate protection against HBV within 1-16 years after vaccination.20 The success of vaccination was assessed by detection of anti-HBs in serum after complete Hepatitis B vaccination as much as 3-4 times.21 Hepatitis B antibodies titer is said to be protective when anti-HBsAg antibody titer >10 mcg/mL which means the person already has immunity to Hepatitis B and does not need to be vaccinated, and vice versa if.22 Research in Padang, only about 18-24% of protective anti-HBs are present after 10 years of vaccination, about 17-21% of protective anti-HBs after 11 years of vaccination and 6-7% of protective anti-HBs remaining after 12 years of hepatitis B vaccines.23

In research at Pondok Pesantren Putri Ibnu Qoyyim Yogyakarta, there are factors related to the incidence of Hepatitis B that is a family history of Hepatitis B with (p<0.05) OR 7.636. This suggests that having a family history of Hepatitis B has a 7 times more risk of HBV infection than they do not have a family history of hepatitis B.24 The research about pregnant women in Banjarasan obtained no effect family history of Hepatitis against Hepatitis B incidence, this fact shows there are other factors that served to protect against
HBV infection, if the community has a strong immune system so when there is infection with HBV, a defense mechanism in his body will be able to form anti-HBs in a protective level (>10 mUI/ml) or family with home contact with Hepatitis B patients to protect Hepatitis B vaccination to provide special protection against HBV infection.

There is no effect on the number of sexual partners on the incidence of Hepatitis B. This result is not compatible with research conducted by Su & Chow, et al in China which states that transmission of Hepatitis B through unprotected sexual intercourse on heterosexual is another major transmission route after vertical transmission (from mother to child born) this is evidenced by the high prevalence of hepatitis B in female sex workers is 10.7% (7.3-15.5%). Similarly, factors affecting heterosexual for sexually transmitted infections including Hepatitis B are individuals who frequently switch sexual partners and engage in unprotected sexual intercourse. This phenomenon is different because pregnant women who have the number of sexual partners >1 in the city of Banjarmasin very little (2.8%) so that statistically meaningless. There are 2 pregnant women with sexual partner >1 and show reactive HBsAg result and seen from Hepatitis B vaccination status it turns out that 2 of these pregnant women have never received Hepatitis B immunization.

CONCLUSION

There is the only history of Hepatitis B vaccination that affects the incidence of Hepatitis B in pregnant women in the city of Banjarmasin. Government programs for Hepatitis B vaccination are only done for infants and toddlers, not yet targeted for other at-risk groups. It is recommended to be given Booster Hepatitis B vaccination at the age of 15 years because the protection of Hepatitis B vaccination given in infancy-toddlers has decreased can even be lost. So that the teenager as a future mother and father will become protected from HBV infection and will not transmit to her child.

Ethical Clearance: Before conducting the data retrieval, the researchers conducted a decent test of ethics conducted at the Faculty of Medicine, Lambung Mangkurat University to determine that this study has met the feasibility. Information on an ethical test that the study is eligible to continue. The feasibility of the research was conducted in an effort to protect the human rights and security of research subjects.

Source Funding: This study was done by self-funding from the authors.

Conflict of Interest: The authors declare that they have no conflict interests.

REFERENCES

7. Pracoyo, NE & Wibowo. 2016. Factors Associated with Immune Hepatitis B (anti-HBs) Levels in Children 1-14 Years from Data from Basic Health Research 2007. Media Litbangkes. 26 (1); 59 -64.
Infectivity of Blood Components from Donors with Occult Hepatitis B Infection—Results from an Australian Lookback Programme. Vox Sang J. 108 (4); 113 -122.


13. Teseema, B & Yismaw, G. et al. 2010. Seroprevalence of HIV, HBV, HCV, and Syphilis Infections Among Blood Donors at Gondar University Teaching Hospital, Northwest Ethiopia: Declining Trends Over A Period of Five Years. BMC Infectious Disease 10 (10); 110 -111.


23. Aswati, L & Journalist, YD et al. 2013. Factors Associated with Anti-Hbs Levels in Primary School Children After 10-12 Years of Hepatitis B Immunization in Padang. Sari Pediatri. 14 (5); 303-308


Investment Decision Factors Influencing the Share Market Investors in Chennai City

V Venkatragavan¹, M Chandran²
¹Research Scholar, ²Research Supervisor, Dept. of Commerce, Vistas, Pallavaram, Chennai

ABSTRACT

In this paper the researcher sharply estimated the investment decision factors responsible for buying and selling the shares in the capital market arena. The research is mainly based on primary data and responses are collected through well framed questionnaire. The researcher used convenient sampling method to collect the responses from the unknown population of market investors. The multivariate statistical tools confirmatory factor analysis and linear multiple regression analysis are applied to validate the whole research. It is found that five factors risk involved, returns gained, safe investment, value increase and share performance are responsible for share market investors investment decision.

Keywords: Share Market, Capital Market, Investment Decisions.

INTRODUCTION

Share market investment is considered as one of the most popular investment in India. This investment process magnetically attracts the investors for its unexpected optimistic returns and high profitability. Many investors feel that the share market investment arena is broadly categorized into inter and intra trade which completely depends on the probability of occurrence of profitability. There is a fifty percent probability especially for profitability as well as loss. These important consequences in both sides motivate the investors for taking careful investment decision. Since investment behaviour and psychology of investors expect only the optimistic reality, investors are made to take minimum risk to obtain maximum returns. But, this sort of psychology cannot be generalized as the behaviour of all share market investors. They have different behaviour and psychology for share preference, awareness, and investment decision and satisfaction level. Hence the research aims at categorizing the preference, awareness, investment decision and satisfaction empirically and intended to give a newly generalized investment decision factors with statistical preciseness.

LITERATURE REVIEWS

Sankaran, E (2004) proposes the future direction for investors will be to invest in pension funds, as Government is envisaging a policy to cover all kinds of investors. He revealed that Mutual Fund industry will continue to grow in spite of competition and will be propelled in the right direction because of the investor friendly financial markets³.

Sathish, D (2004) revealed that investors from seven major cities in India had a preference for shares compared to banking and insurance products. Investors expected moderate return and accepted moderate risk. 60 percent of investors preferred growth schemes. The image of AMC acted as a major factor in the choice of schemes. Investors had the same level of confidence towards shares and shares⁴.

Singh, F and Chander(2004) indicated that middle class salaried investors and professionals preferred to have disclosure of net asset value on a day today basis and wanted to invest in Shares in order to get higher tax rebates. Their study revealed that small investors perceived Shares as good investment alternative and
public sector investments as less risky. Venkateshwarlu, M (2004) had analyzed investors from the twin cities of Hyderabad and Secunderabad and the study revealed that investors preferred to invest in open-end schemes with growth objectives. Chi-squared value revealed that the size of income class is independent of preference pattern and dependent on the choice of fund floating institution. Reasonable returns and long-term strategy adopted by the scheme were the criteria of scheme selection. Investors perceived that too many restrictions led to the average performance of shares in India.

Kavitha Ranganathan (2006) made a study to understand the financial behavior of MF investors with regard to scheme preference and selection. She indicated MF as the ideal option for an individual who does not have the time, knowledge or experience to make a succession of judgments involving his hard-earned savings.

Sanjay Kant Khare (2007) indicated that investors could purchase stocks or bonds with much lower trading costs through shares and enjoy the advantages of diversification and lower risk. The researcher revealed that with a higher savings rate of 23 percent, channeling savings into shares sector has been growing rapidly as retail investors were gradually keeping out of the primary and secondary market. He suggested that Shares have to penetrate into rural areas with diversified products, better corporate governance and through introduction of financial planners.

**GAPS IN THE LITERATURE**

After reviewing national and international literature, the researcher identified two important lacunae namely

1. They did not address on the determination factors responsible for investment decision of share market investors in the geographical base of Chennai.

2. The structure did not address the validity issues of investment decision factors.

Hence the present research work mainly focuses on these issues.

**OBJECTIVE OF THE STUDY**

**BASED ON THESE RESEARCH GAPS HE FOLLOWING OBJECTIVES ARE COINED BY THE RESEARCHER**

1. To identify the factors influencing the investment decision of share market investors.

2. To validate the derived factors of the research

**HYPOTHESIS:**

There is no relationship between risk involved and investment decision.

**METHODOLOGY**

This study is mainly based on primary data which is collected through structured questionnaires. The questionnaire consists of three parts namely demographic variables, share details and investment decision. First two parts information obtained through optional type questions and investment decision is obtained through statements in five point scale. Totally researcher generated 24 statements on investment decision from literature.

**Data collection:** Researcher adopted convenience sampling method to collect the responses from share market investors in Chennai city. The researcher circulated 10 questionnaires each in all the 15 zones of Chennai city. But the researcher is able to obtain only 143 usable responses from the investors of share market. Hence the sample size of the research is 143.

**Data analysis:** After obtaining 143 responses, the researcher systematically tabulated them and used SPSS 20 version to analyse the data. The researcher used confirmatory and exploratory factor analysis and linear multiregression analysis to find and validate the factors of investment decisions.

**ANALYSIS AND DISCUSSION**

In order to identify the factors of investment decision the researcher applied exploratory factor analysis on the 24 variables of investment decision and obtained the following results.
Table 1:

<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>.624</td>
</tr>
<tr>
<td>Bartlett’s Test of Sphericity</td>
<td></td>
</tr>
<tr>
<td>Approx. Chi-Square</td>
<td>2970.027</td>
</tr>
<tr>
<td>df</td>
<td>276</td>
</tr>
<tr>
<td>Sig.</td>
<td>.000</td>
</tr>
</tbody>
</table>

From the above table, it is found that the KMO value, sphericity value and chi-square value are statistically significant at 5 percent level. This shows that the sample size is sufficient to represent the population of investors. The following table gives the transparency on the derivation of factors.

Table 2- Total variance of investment decision variables.

<table>
<thead>
<tr>
<th>Component</th>
<th>Initial Eigen values</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
</tr>
<tr>
<td>2</td>
<td>2.306</td>
<td>9.608</td>
</tr>
<tr>
<td>3</td>
<td>1.977</td>
<td>8.237</td>
</tr>
<tr>
<td>4</td>
<td>1.735</td>
<td>7.228</td>
</tr>
<tr>
<td>6</td>
<td>1.419</td>
<td>5.913</td>
</tr>
<tr>
<td>7</td>
<td>1.231</td>
<td>5.127</td>
</tr>
<tr>
<td>8</td>
<td>1.093</td>
<td>4.553</td>
</tr>
<tr>
<td>9</td>
<td>1.053</td>
<td>4.388</td>
</tr>
<tr>
<td>10</td>
<td>.849</td>
<td>3.537</td>
</tr>
<tr>
<td>11</td>
<td>.787</td>
<td>3.280</td>
</tr>
<tr>
<td>12</td>
<td>.750</td>
<td>3.124</td>
</tr>
<tr>
<td>13</td>
<td>.691</td>
<td>2.879</td>
</tr>
<tr>
<td>14</td>
<td>.603</td>
<td>2.514</td>
</tr>
<tr>
<td>15</td>
<td>.592</td>
<td>2.468</td>
</tr>
<tr>
<td>16</td>
<td>.521</td>
<td>2.172</td>
</tr>
<tr>
<td>17</td>
<td>.475</td>
<td>1.977</td>
</tr>
<tr>
<td>18</td>
<td>.448</td>
<td>1.869</td>
</tr>
<tr>
<td>19</td>
<td>.402</td>
<td>1.673</td>
</tr>
<tr>
<td>20</td>
<td>.389</td>
<td>1.621</td>
</tr>
<tr>
<td>21</td>
<td>.350</td>
<td>1.458</td>
</tr>
<tr>
<td>22</td>
<td>.279</td>
<td>1.163</td>
</tr>
<tr>
<td>23</td>
<td>.256</td>
<td>1.066</td>
</tr>
<tr>
<td>24</td>
<td>.234</td>
<td>.977</td>
</tr>
</tbody>
</table>

From the above table, it is found that the total variance is 48.243 percent which is above the benchmark value of 40 percent. It also showed the derivation of five factors with individual variances. The factors have their variable loadings and they have been named as **Risk free, Profitable returns, continuous income, Regulatory authorities and motivating scenarios**. These factors and their loaded variables are validated through the following confirmatory factor analysis as shown in the model and fit indices.
The confirmatory factor analysis is applied on the above mentioned derived factors to imply the investment decision of share market investors in Chennai city.

**Table 3. Reliability of investment decision factors.**

<table>
<thead>
<tr>
<th>Factors</th>
<th>No. of Items</th>
<th>Cronbach alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Recruitment</td>
<td>5</td>
<td>0.818</td>
</tr>
<tr>
<td>2. Performance appraisal system</td>
<td>5</td>
<td>0.911</td>
</tr>
<tr>
<td>3. Career development</td>
<td>5</td>
<td>0.901</td>
</tr>
<tr>
<td>4. Executive development</td>
<td>5</td>
<td>0.886</td>
</tr>
<tr>
<td>5. Potential appraisal</td>
<td>4</td>
<td>0.863</td>
</tr>
</tbody>
</table>

From the above table, it is found that all the cronbach alpha values are greater than 0.75. It implies that all the factors of investment decision derived by the researcher are highly reliable. The investors feel that their investment decisions are predominantly affected by these factors in the share market. After the verification of reliability the researcher intended to validate all the responses pertaining to investment decisions. The application of confirmatory factor analysis method derived the following results.

**Table 4. Fit indices of confirmatory factor analysis.**

<table>
<thead>
<tr>
<th>Fit indices</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi square value</td>
<td>0.444 &gt;0.05</td>
</tr>
<tr>
<td>Goodness of fit index</td>
<td>0.934 &gt;0.9</td>
</tr>
<tr>
<td>Comparative fit index</td>
<td>0.941 &gt;0.9</td>
</tr>
<tr>
<td>Normal fit index</td>
<td>0.939 &gt;0.9</td>
</tr>
<tr>
<td>Root mean square error of approximation</td>
<td>0.07 &lt;0.08</td>
</tr>
</tbody>
</table>

From the above table, it is found that all the five fit indices satisfy the bench mark value for the validity of five predominant factors of investment decision towards share market. These results are also able to prove the following findings and able to establish the conclusions.

**FINDINGS AND CONCLUSIONS**

The application of exploratory and confirmatory factor analysis revealed the following findings

1. There is a significant relationship between risk free investment and share market investment decisions.
2. There is a significant relationship between Profitable returns and share market investment decisions.
3. There is a significant relationship between continuous income and share market investment decisions.
4. There is a significant relationship between Regulatory authorities and share market investment decisions.
5. There is a significant relationship between motivating scenarios and share market investment decisions.

It is concluded that the investment decision of share market investors is affected by their risk involved in their investment as well as profitability of the investment. They expect the regulatory authorities of the union to safeguard their investment and show good enthusiasm in having the continuous and regular investment in share market arena.

**Conflict of Interest – Nil**

**Ethical Clearance –** Taken from UGC Committee

**Source of Funding- Self**

**REFERENCES**

An Assessment of Rural Health Care Facilities and Infrastructural Gaps in Alipurduar District, West Bengal, India

Barnali Biswas¹, Piyal Basu Roy²

¹Research Scholar, Department of Geography, Cooch Behar Panchanan Barma University, Vivekananda Street, Cooch Behar, West Bengal, India, ²Associate Professor and Head, Department of Geography, Cooch Behar Panchanan Barma University Vivekananda Street Cooch Behar, West Bengal, India

ABSTRACT

The rural parts of the state of West Bengal, India lack proper healthcare facilities with a number of flaws in its healthcare system. The situation is quite poor in the study area i.e. Alipurduar district which is a forest endowed, an under-developed region of the state. The study tries to analyze the spatial distribution of healthcare facilities along with existing disparities in terms of rural healthcare infrastructure in order to identify the areas of deficiency in the region under study. To conduct this study, Composite Index has been formed to show the level of disparity among the blocks of the district. Results indicate that healthcare facilities are not equitably distributed throughout the district. These facilities are rare in isolated hilly and forest areas where most of the tribal people inhabited; both qualitatively weaker and quantitatively fewer in rural parts; and concentrated only in few urban pockets.

Keywords: Health Care Facility, Infrastructure Gap, Composite Healthcare Infrastructure, Spatial Disparity

INTRODUCTION

Rural health care is considered as one of the determining aspects in health care system, covers a broad range of services from health improvement and preventive services to generalist first level consultations for treatment.¹ Over the last two decades, the economic condition of India has developed substantially and several growth-oriented programs have been launched for enhancement of health sectors in rural areas. Despite Govt. efforts, most of the healthcare services are concentrated in urban areas to the neglect of rural areas and the few ones located in rural areas are not functioning effectively.² Rural people, as a consequence, experience an excess in mortality and morbidity compared to those of urban setting.³

Widening the gaps in healthcare infrastructural facilities is one of the important factors for the inequity between rural-urban areas and constrained the development of existing health care system. The healthcare infrastructural gap is at a dismal level in rural parts of West Bengal particularly in Alipurduar district, physiographically one of the disadvantaged regions of this state with a huge number of tribal inhabitants.

OBJECTIVES

• To identify the spatial distribution of health center facilities for showing the disparities in the study area.

• To determine the existing gaps in health infrastructural facilities.

• To analyze the indices of healthcare infrastructure in rural parts of Alipurduar District.
MATERIAL AND METHOD

This study mainly focuses on the availability of providing health care services and existing gaps in rural parts of Alipurduar district. After identifying the problems related to health care services, the major work of this study depends on secondary sources, obtained from District Statistical Handbook, 2014, Census 2011, C.M.O.H. office, books, Govt. reports etc. A Composite mean of Health Infrastructure Index has been constructed by applying Z-score method among 14 healthcare indicators.

These indicators are-

I. Status of Sub-center = Number of Sub-Centers/5000 population (X1)

II. Status of PHC = Number of PHC/30000 population (X2)

III. Availability of Bed = Number of Beds/30000 population (X3)

IV. Status of Doctor = Number of Doctor/one lakh population (X4)

V. Status of Nurse = Number of Nurse/30000 population (X5)

VI. Status of ANM = Number of ANM/5000 population (X6)

VII. Status of ASHA = Number of ASHA/1000 population (X7)

VIII. Status of Anganwadi Centers = Number of AWC/1000 population (X8)

IX. Status of Nursing Home = Number of Nursing Home/one lakh population (X9)

X. Health Center Density = Number of Health Center/10 sq.km area (X10)

XI. Status of Non-Govt. Medical Shop = Number of Non-Govt. Medical Shop /10000 population (X11)

XII. Status of Ambulance = Number of Ambulance/1000 population (X12)

XIII. Ambulance Density = Number of Ambulance/100 sq.km (X13)

XIV. Number of Dispensaries (X14)

Whereas, the following formula is used when applying Z-score method:

\[ Z = \left( \frac{X-\mu}{\sigma} \right) \]

where,

\[ Z = \text{z-score} \]

\[ X = \text{Value of healthcare indicators} \]

\[ \mu = \text{mean of the variable} \]

\[ \sigma = \text{standard deviation} \]

Gaps in different healthcare facilities are calculated by using following formula:

\[ Fg = N - \left( \frac{n}{p} \times P \right) \]

where,

\[ Fg = \text{Gaps in particular facilities} \]

\[ N = \text{Existing number of healthcare facilities} \]

\[ n = \text{Optimum number of particular healthcare facilities} \]

\[ p = \text{Expected number of population/value for particular facilities} \]

\[ P = \text{Block population/value} \]

FINDINGS

Spatial Distribution of Health Care Center Facilities: The spatial distribution of healthcare facilities is not optimally spaced due to the differences in accessibility and transport availability. This situation is indifferent in Alipurduar district. Healthcare infrastructure includes the facilities of different health centers like Sub-center, PHCs, Anganwadi Center, Family Welfare Centre, District hospital, etc.

<table>
<thead>
<tr>
<th>Name of Blocks</th>
<th>Sub Center</th>
<th>PHC</th>
<th>CHC</th>
<th>Anganwadi Center</th>
<th>Family Welfare Centre</th>
<th>Dispensary</th>
<th>Non-Govt. Medicine Shop</th>
<th>Hospital Allopathic</th>
<th>Nursing home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alipurduar I</td>
<td>36</td>
<td>2</td>
<td>1</td>
<td>230</td>
<td>0</td>
<td>7</td>
<td>45</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Alipurduar II</td>
<td>36</td>
<td>2</td>
<td>2</td>
<td>240</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Falakata</td>
<td>44</td>
<td>2</td>
<td>1</td>
<td>310</td>
<td>3</td>
<td>5</td>
<td>53</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Kalchini</td>
<td>48</td>
<td>2</td>
<td>1</td>
<td>290</td>
<td>4</td>
<td>8</td>
<td>52</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 1. Status of Health Center Facilities in Alipurduar District

<table>
<thead>
<tr>
<th>Name of Blocks</th>
<th>No. of Population</th>
<th>Sub Center</th>
<th>Primary Health Center</th>
<th>Community Health Center</th>
<th>Anganwadi Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kumargram</td>
<td>35</td>
<td>2</td>
<td>1</td>
<td>200</td>
<td>0</td>
</tr>
<tr>
<td>Madarhat-Birpara</td>
<td>37</td>
<td>3</td>
<td>1</td>
<td>210</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Census of India, 2011 & District Statistical Cell, C.M.O.H. Office Alipurduar

Table 1 shows the data of the census of India, 2011 that Family Welfare Centers are only located in Falakata and Kalchini block whereas in Alipurduar II and Kumargram blocks, there are no dispensaries is found. In Kalchini block, the concentration of Non-Government Medicine Shop and Allopathic Hospitals is good while many other blocks are lagged behind. The distribution of private hospitals is highest (05) in Alipurduar I as it tends to locate in economically developed municipal areas. Though this private Nursing Home service helps the health care system, sometimes it is too expensive to bear. In addition, patients from Alipurduar II blocks can easily get the facilities from Alipurduar I due to the lesser distance from their block.

According to the report of District Statistical Hand Book, C.M.O.H. Office, in Falakata and Kalchini blocks, the number of sub-center is highest (44 & 48). The distribution of PHCs and CHCs are almost similar in all blocks. In addition, the concentration of Anganwadi Center seems to be good in Falakata and Kalchini blocks compare to other blocks.

Health Care Infrastructural Gaps in Alipurduar District: The health infrastructural deficiency as per its requirements is referred as infrastructural gaps in healthcare system. Health Survey and Development Committee, India on their report 1946 has declared that “the infrastructural inadequacy or gaps of existing medical organization” is one of the important factors for India’s poor health condition in its report. To show the extent of mismatches between provided healthcare facilities and its desirable Govt. norms the above-mentioned formula has been applied.

Gaps in Health Care Center Facilities

The rural health system has mainly based on three-tier structure, namely Sub Center, Primary Health Center and Community Health Center. The basic infrastructure norms of the populations are that 5000 per Sub Center, 30000 per PHC and 120000 per CHC in plain areas, in case of tribal areas the number of population coverage has lowered.

Table 2 Gaps in Health Care Center Facilities of Alipurduar District

<table>
<thead>
<tr>
<th>Name of Blocks</th>
<th>No. of Population</th>
<th>Sub Center</th>
<th>Primary Health Center</th>
<th>Community Health Center</th>
<th>Anganwadi Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alipurduar I</td>
<td>228003</td>
<td>46</td>
<td>-10</td>
<td>07</td>
<td>-05</td>
</tr>
<tr>
<td>Alipurduar II</td>
<td>233942</td>
<td>47</td>
<td>-11</td>
<td>08</td>
<td>-06</td>
</tr>
<tr>
<td>Falakata</td>
<td>305786</td>
<td>61</td>
<td>-17</td>
<td>10</td>
<td>-08</td>
</tr>
<tr>
<td>Kalchini</td>
<td>289771</td>
<td>58</td>
<td>-10</td>
<td>10</td>
<td>-08</td>
</tr>
<tr>
<td>Kumargram</td>
<td>209804</td>
<td>42</td>
<td>-07</td>
<td>07</td>
<td>-05</td>
</tr>
<tr>
<td>Madarhat-Birpara</td>
<td>207530</td>
<td>42</td>
<td>-05</td>
<td>07</td>
<td>-04</td>
</tr>
</tbody>
</table>

Source: Compiled by Authors
From Table 2, it is understood that in Falakata block the Sub Center facility is worst as there infrastructural gap is -17 whereas in Madarihat-Birpara block this gap is comparatively lesser (-05).

The availability of PHCs is poor in Falakata and Kalchini blocks, share the same situation (-08) while the better condition is found in Madarihat-Birpara block (-04) but fulfills only 50 percent of population norms.

In case of CHCs, the situation throughout the district is poor except for Alipurduar II where the population norm has achieved as there CHCs facility gap is ‘0’.

Table. 3 Gaps in Bed Facilities in Alipurduar District

<table>
<thead>
<tr>
<th>Name of Blocks</th>
<th>No. of Population</th>
<th>No of existing facilities</th>
<th>No. of required</th>
<th>GAPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alipurduar I</td>
<td>228003</td>
<td>40</td>
<td>50</td>
<td>-10</td>
</tr>
<tr>
<td>Alipurduar II</td>
<td>233942</td>
<td>70</td>
<td>80</td>
<td>-10</td>
</tr>
<tr>
<td>Falakata</td>
<td>305786</td>
<td>30</td>
<td>50</td>
<td>-20</td>
</tr>
<tr>
<td>Kalchini</td>
<td>289771</td>
<td>40</td>
<td>50</td>
<td>-10</td>
</tr>
<tr>
<td>Kumargram</td>
<td>209804</td>
<td>40</td>
<td>50</td>
<td>-10</td>
</tr>
<tr>
<td>Madarihat-Birpara</td>
<td>207530</td>
<td>50</td>
<td>60</td>
<td>-10</td>
</tr>
</tbody>
</table>

Source: Compiled by Author

As presented in Table 3, in Falakata, the capacity is found to be worst (-20) as there are no bedding facilities in PHCs. The other blocks of this district, where the situation is almost similar, the gaps in the availability of bed is -10, don’t satisfy patients’ requirements as they seem to share a bed and even lie on the floor for getting treatment. Gaps in Health Man Power Facilities.

Gaps in Health Man Power Facilities

Development of quality healthcare is largely dependent on the provision of an adequate number of skilled personnel. But this district has experienced the paucity of skilled manpower, is similar in all blocks.

Table. 4 Gaps in Health Man Power Facilities of Alipurduar District

<table>
<thead>
<tr>
<th>Name of Blocks</th>
<th>Doctors</th>
<th>Nurse</th>
<th>Auxiliary Nurse Midwives (ANM)</th>
<th>ASHA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of existing facilities</td>
<td>No of required</td>
<td>GAPS</td>
<td>No of existing facilities</td>
</tr>
<tr>
<td>Alipurduar I</td>
<td>05</td>
<td>09</td>
<td>-03</td>
<td>13</td>
</tr>
<tr>
<td>Alipurduar II</td>
<td>06</td>
<td>12</td>
<td>-06</td>
<td>25</td>
</tr>
<tr>
<td>Falakata</td>
<td>07</td>
<td>09</td>
<td>-02</td>
<td>18</td>
</tr>
<tr>
<td>Kalchini</td>
<td>06</td>
<td>09</td>
<td>-03</td>
<td>16</td>
</tr>
<tr>
<td>Kumargram</td>
<td>07</td>
<td>09</td>
<td>-02</td>
<td>17</td>
</tr>
<tr>
<td>Madarihat-Birpara</td>
<td>07</td>
<td>10</td>
<td>-03</td>
<td>17</td>
</tr>
</tbody>
</table>

Source: Compiled by Author
As Table 4 presents, the facility of doctors is worst in Alipurduar II block where the doctor availability gap is -0.6. The other blocks have also experienced the lack of doctors (-0.2 to -0.3). In this district, almost all the PHCs are running with only one doctor while the required post is two.\(^4\)

All the blocks of Alipurduar district have achieved the Govt. norms for nursing stuff and enjoy their serving facility particularly in Alipurduar II and Falakata blocks where surplus nurses are in position.

The ANM facility gap is higher in Falakata Block (-38) where one ANM or 2nd ANM has to take the charge of more than one Sub Centers while the other blocks of this district share almost similar situation, far to fulfill Govt. norms.

In case of availability of ASHA, the situation is poor, is almost similar across the district except for Kalchini block where the gap is higher - 172. Though Madarihat-Birpara block has shown a little improvement (-50) but yet not fulfill Govt. norms - one ASHA per 1000 population.\(^5\)

**Status of Composite Health Care Infrastructure:**

Health infrastructure constitutes a major component of the structural quality of health system.\(^6\) When the components are strong, the system can carry out its core functions with uniform effectiveness.\(^7\) In order to get composite Health Care Infrastructure Index (HCII), Z score formula has been applied to 14 healthcare related components.

**Table. 5 Composite Health Infrastructure Facilities in Alipurduar District**

<table>
<thead>
<tr>
<th>Name of Blocks</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
<th>X7</th>
<th>X8</th>
<th>X9</th>
<th>X10</th>
<th>X11</th>
<th>X12</th>
<th>X13</th>
<th>X14</th>
<th>HCII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alipurduar I</td>
<td>-0.26</td>
<td>-0.12</td>
<td>-0.20</td>
<td>-0.76</td>
<td>-0.81</td>
<td>0.15</td>
<td>-0.04</td>
<td>-0.71</td>
<td>1.81</td>
<td>-1.12</td>
<td>1.03</td>
<td>1.95</td>
<td>1.61</td>
<td>0.95</td>
<td>0.24</td>
</tr>
<tr>
<td>Alipurduar II</td>
<td>-0.60</td>
<td>-0.20</td>
<td>1.51</td>
<td>-0.12</td>
<td>1.64</td>
<td>-0.40</td>
<td>0.67</td>
<td>-0.97</td>
<td>-0.87</td>
<td>-0.38</td>
<td>-0.88</td>
<td>0.05</td>
<td>0.13</td>
<td>-1.04</td>
<td>-0.10</td>
</tr>
<tr>
<td>Falakata</td>
<td>-1.44</td>
<td>-0.90</td>
<td>-1.28</td>
<td>-0.60</td>
<td>-0.72</td>
<td>-1.14</td>
<td>0.34</td>
<td>-0.99</td>
<td>-0.07</td>
<td>-0.71</td>
<td>0.72</td>
<td>-1.24</td>
<td>-1.02</td>
<td>0.38</td>
<td>-0.54</td>
</tr>
<tr>
<td>Kalchini</td>
<td>0.38</td>
<td>-0.77</td>
<td>-0.72</td>
<td>-0.97</td>
<td>-0.89</td>
<td>1.16</td>
<td>-1.70</td>
<td>0.69</td>
<td>-0.87</td>
<td>1.52</td>
<td>0.80</td>
<td>-0.67</td>
<td>-1.11</td>
<td>1.23</td>
<td>-0.06</td>
</tr>
<tr>
<td>Kumargram</td>
<td>0.48</td>
<td>0.14</td>
<td>0.00</td>
<td>1.20</td>
<td>0.37</td>
<td>1.14</td>
<td>-0.43</td>
<td>0.82</td>
<td>-0.29</td>
<td>0.83</td>
<td>-0.32</td>
<td>-0.40</td>
<td>0.45</td>
<td>-1.04</td>
<td>0.21</td>
</tr>
<tr>
<td>Madarihat-Birpara</td>
<td>1.44</td>
<td>1.86</td>
<td>0.70</td>
<td>1.27</td>
<td>0.41</td>
<td>-0.91</td>
<td>1.15</td>
<td>1.17</td>
<td>0.30</td>
<td>-0.13</td>
<td>-1.36</td>
<td>-0.69</td>
<td>-1.05</td>
<td>-0.47</td>
<td>0.26</td>
</tr>
</tbody>
</table>

Source: Compiled by Author

The obtained Health Care Infrastructural Index has been categorized into 3 groups – Good (more than 0.2200), Moderate (0.050 to 0.2200) and Low (less than 0.050) to analyze the extent of development in different blocks.

**Good (more than 0.2200):** Madarihat-Birpara and Alipurduar I block ranking the highest in Health Care Infrastructure Index (HCII) indicating less populated and well-communicated blocks have experienced very good healthcare facilities. Madarihat- Birpara block enjoys highest (0.2638) health care facilities where Sub- Center, PHCs and, Doctors facility is very good. Alipurduar I block, the headquarter of this district, where Nursing Home facility, non Govt. medical shop, dispensary facility is very good as this block is economically richer.

**Moderate (0.050 to 0.2200):** The second category includes Kumargram block where the health facility is in a moderate state. This block lying in northeastern part of the district where providing health care indicators have moderate value.

**Low (less than 0.050):** Lastly, Kalchini, Alipurduar II, and Falakata block lie under the category of the lower level, Govt. failed to fulfill the healthcare requirements there. In Falakata block, the value of Health Care Infrastructural Index is worst (-0.5498) due to the pressure of population. These blocks are suffering from all type of health care facilities and as consequence patients have to depend on other blocks during emergencies.

**CONCLUSION**

Healthcare is part of the society as it is one of the important factors to develop a balanced and healthy life. But, in this district, most of the health services have
tended to locate in urban and developed areas, affecting the equities in health infrastructural status among six blocks. Moreover, the health services are found to be weak in densely populated and isolated hilly areas. This widening infrastructural gap is associated with the health status in general followed by significant impact on the area. Therefore, there is an urgent need of reformation of the public health care system within the district by identifying the areas where it is weak. Govt. should take a necessary step to make the health service more affordable and accessible by giving more attention to the allocation of fund and launch new programs to recover this health infrastructural gaps.

**Conflict of Interest:** Conflict of Interest does not exist

**Source of Funding:** This study has not received a grant from any funding agency.

**Ethical Clearance:** Ethical Clearance not applicable in this study

**REFERENCE**


Work Place Violence Against Nursing Staff Working in Emergency Departments at General Hospitals in Basra City

Samira Muhammed Ebrahim¹, Sajjad Salim Issa²

¹Department of Basic Medical Science, ²Department of Nursing Science, Nursing College, University of Basra, Basra, Iraq

ABSTRACT

This study including 84 nurses working at emergency departments at general hospitals in Basra City, to determine the rate and sources of different types of violence, some characteristics of violence incidents and reactions of nurses towards violence incidents. Results showed the majority were exposed to work place violence (90.5%). Exposure to work place violence rate among males (93.8%) was higher than among females (86.1%). Exposure to work place violence rate was lower among younger than 30 years of age (77.8%) than older participating. The majority (71.1%) of the participants were exposed to verbal violence. Relatives of the patients were the major source of violence (86.8%), the main time of exposure to violence was during night shift (48.7%). The main reason for not submitting the incident of violence reports was that they consider it of no importance (76.3%). Nothing was done was consequence for (35.3%) of the work place violence. The main single feeling was disappointment which was expressed by (32.8%) of the participants who exposed to violence.

Keywords: Emergency departments, Work place, Violence, Nursing staff

INTRODUCTION

Emergency department provide very important services for the life threatening conditions and the number of the patients using emergency department is increasing every day and it is a place where health staff should do the most accurate action in less time (1). Their presence in stressful situations exposes them to more abuse or harsh behavior from patients or their companions than other hospital staff (2). Patients and their relatives in response to stress as caused by accidents or illness might use violence against health personnel and a number of official reports, media, stories and international initiatives have focused attention on the problem worldwide (3). High rate of victimization among nursing staff considered as an important reason for losses from the workforce and an inability to attract new staff (4,5).

A study including 68 nursing staff working in central emergency of imam raze hospital, revealed that all nurses were exposed to verbal violence at least once during the last year and (22.1%) experienced physical violence, patient’s relatives were the main source and most of the nurses had not taken any action against them and more than half of the nurses do not report the incident of violence because they thought it’s useless to report or talk about it (1). Other study in Iran including 6500 health personnel the findings revealed that nurses were the main victims of physical violence (78%) and patients’ families were the main perpetrators of violence (56%) (6).

In Australia a study in 94 nursing wards revealed that about one third of participated nurses perceived emotional abuse during the last five shift worked (7). A cross sectional survey in Chinese hospitals on 588 nurse revealed that (7.8%) of the nurses reported exposure to physical violent incident and (71.9%) non physical violent experiences in the preceding year. Nurses with low experience were more likely to report physical (13.2%) or non-physical (89.5%) violence compared with more experienced nurses (8). The results from retrospective study on 275 Italian nurses showed that 43% of nurses were exposed to at least one attack of physical or verbal violence during lifetime activity in clinical setting and were mostly assaulted by patients or
their relatives and friends\(^{(9)}\).

A national survey in Kuwait including 5876 nurses showed that the rates of verbal violence and physical violence experienced by nurses were (45.7%) respectively in the 6 previous months\(^{(10)}\). In Riyadh Saudi Arabia a study conducted on 121 nurses revealed high overall incidence of workplace violence was (89.3%), and (74.1%) of nurses were exposed to verbal abuse in the past 12 month, including 23 (21.3%) exposed to violence more than four times. The incidents of violence was the highest in the evening shift. Patients (82.4%) and their relatives (64.8%) were the main source of violence\(^{(5)}\). In Palestinian hospitals a study including 271 physicians and nurses, the majority of respondents (80.4%) reported exposure to violence in the previous 12 months, No statistical difference in exposure to violence between physicians and nurses was observed and males significantly experienced higher exposure to physical violence in comparison with females violence\(^{(11)}\). Across sectional study conducted in general hospitals in Jordan including 468 nurse, (52.8%) of them reported that they were physically attacked and (67.8%) were verbally attacked in the last 12 months. Female nurses were 0.5 times less likely to report being physically attacked and were 1.5 times more likely to report being verbally abused than male nurses\(^{(12)}\). Other study on 447 nurses working in various departments in 3 hospitals in Amman. Verbal and physical abuse was 37.1% and 18.3% respectively. Patients and their relatives were the usual abusers. Only 35.1% of the abused nurses reported it; of those that did not, 57.1% thought it was useless to do so\(^{(2)}\). In Basra city Iraq, previous study conducted in Basra hospitals on 198 emergency care staff (48.7%) of the respondents had faced verbal violence, (24.6%) faced physical violence and most victim did not take an action after the end of the violence incident\(^{(3)}\).

**OBJECTIVES OF THE STUDY**

1- Design of the study: Descriptive, cross sectional study.

2- Setting of the study: the emergency department in Basra hospitals

3- The sample of the study: sample of 84 nurses working in emergency department. Structured questionnaire was used for the purpose of the data collection; the data collection was carried out from December 2016 through February 2017. The questionnaire contains two parts the first part consist of 6 items related to social demographic characteristics of the nurses the second part consist of 14 question related about exposed to violence incident to nurses. Data was collected via face-to-face interviews by two senior nursing students. Each interview session took 10 to 15 minute.

Before any attempt to collect data, approval to conduct the study was obtained from general health directorate of Basra. Participant were informed about the aim of the study, they have the 4- Statistical analysis: Analysis was made by using SPSS version 23, data was expressed in (frequency and percentage). Chi-squared test was used to examine the association between the groups and a probability of less than 0.05 was consider to be statistically significant.

**RESULTS**

**Table 1. Socio demographic characteristics of the participants (n=84)**

<table>
<thead>
<tr>
<th>Characteristics of participants</th>
<th>Categories /groupings</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>48</td>
<td>57.1</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>36</td>
<td>42.9</td>
</tr>
<tr>
<td>Age in years</td>
<td>&gt;30 years</td>
<td>27</td>
<td>32.1</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>33</td>
<td>39.3</td>
</tr>
<tr>
<td></td>
<td>40+</td>
<td>24</td>
<td>28.6</td>
</tr>
<tr>
<td>Level of education</td>
<td>Secondary nursing school</td>
<td>56</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td>High institute</td>
<td>26</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Nursing college</td>
<td>2</td>
<td>2.3</td>
</tr>
</tbody>
</table>
Table 1 showed that (57.1%) of the studied sample were males, the majority of the sample were below (40) years of age, regarding education level (66.7%) of sample were Secondary nursing school graduate, regarding the duration of employment in the emergency department, (36.9%) were less than (5) years, high percent (79.8%) had a work shift of (6) hours. Majority were exposed to work place violence (90.5%).

Table 2. Exposure to work place violence according to gender and age (n=84)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Gender</th>
<th>Exposed to violence</th>
<th>Not exposed to violence</th>
<th>X²</th>
<th>Df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Males</td>
<td>45</td>
<td>93.8</td>
<td>3</td>
<td>6.2</td>
<td>1.939</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>31</td>
<td>86.1</td>
<td>5</td>
<td>13.9</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>&gt;30 years</td>
<td>21</td>
<td>77.8</td>
<td>6</td>
<td>22.2</td>
<td>7.467</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>32</td>
<td>97</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40+</td>
<td>23</td>
<td>95.8</td>
<td>1</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>76</td>
<td>90.5</td>
<td>8</td>
<td>9.5</td>
<td></td>
</tr>
</tbody>
</table>

Exposure to work place violence rate among males (93.8%) was higher than among females (86.1%). although the differences was statistically not significant (p >0.05). Exposure to work place violence rate was lower among younger than 30years of age (77.8%) than older participants and the difference was statistically significant (p< 0.05) as shown in table 2.

Table 3. Characteristics of work place violence during the last 12 months among the participants (n=76)

<table>
<thead>
<tr>
<th>Characteristics violence</th>
<th>Categories /groupings</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Verbal</td>
<td>54</td>
<td>71.1</td>
</tr>
<tr>
<td></td>
<td>Physical</td>
<td>22</td>
<td>28.9</td>
</tr>
<tr>
<td>Frequency</td>
<td>Once</td>
<td>10</td>
<td>13.2</td>
</tr>
<tr>
<td></td>
<td>Two to three times</td>
<td>10</td>
<td>13.2</td>
</tr>
<tr>
<td></td>
<td>Four and more</td>
<td>56</td>
<td>73.6</td>
</tr>
</tbody>
</table>
Cont... Table 3. Characteristics of work place violence during the last 12 months among the participants (n=76)

<table>
<thead>
<tr>
<th>Attacked by whom</th>
<th>Patient</th>
<th>2</th>
<th>2.6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Relatives of the patients</td>
<td>66</td>
<td>86.8</td>
</tr>
<tr>
<td></td>
<td>Both of the above</td>
<td>8</td>
<td>10.6</td>
</tr>
<tr>
<td>Time during which violence occurred</td>
<td>At Day shifts</td>
<td>18</td>
<td>23.7</td>
</tr>
<tr>
<td></td>
<td>At Night shifts</td>
<td>37</td>
<td>48.7</td>
</tr>
<tr>
<td></td>
<td>During Holidays</td>
<td>21</td>
<td>27.6</td>
</tr>
<tr>
<td>Submission of violence report to the administration</td>
<td>Yes</td>
<td>17</td>
<td>22.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>59</td>
<td>77.6</td>
</tr>
</tbody>
</table>

The majority (71.1%) of the participants was exposed to verbal violence. 73.6% of them exposed for four times or more attacks of violence. Relatives of the patients were the major source (86.8%). The main time of exposure to violence was during night shift (48.7%) as shown in table 3.

Table 4. Causes of not submission of work place violence report among the participants (n=59)

<table>
<thead>
<tr>
<th>Causes</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was not important</td>
<td>45</td>
<td>76.3</td>
</tr>
<tr>
<td>Afraid of consequences</td>
<td>14</td>
<td>23.7</td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>100</td>
</tr>
</tbody>
</table>

The main reason for not submitting the incident of violence reports was that they consider it of not important (76.3%), (23.7%) were afraid from consequences of reporting, as shown in table 4.

Table 5. Consequences of submission of work place violence incident reported to hospital authorities by the participants (n=17)

<table>
<thead>
<tr>
<th>Consequences</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing done</td>
<td>6</td>
<td>35.3</td>
</tr>
<tr>
<td>Verbal warning to attacker</td>
<td>5</td>
<td>29.4</td>
</tr>
<tr>
<td>Aggressor prosecution to attacker</td>
<td>6</td>
<td>35.3</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>

Nothing was done was consequence for (35.3%) of the work place violence as shown in table 5.

Table 6. Feelings of the participants toward the violence incidents

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disappointment</td>
<td>25</td>
<td>32.8</td>
</tr>
<tr>
<td>Sadness</td>
<td>12</td>
<td>15.8</td>
</tr>
<tr>
<td>Failure</td>
<td>10</td>
<td>13.2</td>
</tr>
<tr>
<td>Shocked</td>
<td>5</td>
<td>6.6</td>
</tr>
<tr>
<td>More than one of the above feelings</td>
<td>24</td>
<td>31.6</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>100</td>
</tr>
</tbody>
</table>

The main single feeling was disappointment which was expressed by (32.8%) of the participants who exposed to violence. as shown in table 6.

DISCUSSION

Regarding the socio-demographic characteristic of the participants in this study does not differ much than what was reported in previous study in Basra(1). Majority of nursing staff in this study were exposed to work place violence (90.5%). similar study in Jordan (91.4%) (13). In this study exposure to work place violence among males was higher than females this could be due to the social and cultural factors that may lead to avoid attacking or insulting women. Exposure to work place violence rate was lower among those younger than 30 years than older age participants, reverse pattern seen in other studies (2,3). Regarding exposure of emergency department staff to verbal violence, it was stated that
its rate internationally lies between 21–82.4% (14), the current rate (71.1%) lies within these limits.

Majority (71.1%) of the participation was exposed to verbal violence lower than other studies done in Greece 75.2% and Iran 91.6% (15,16), and higher than what was reported from other study in Iran 64.09% (17) and of previous study in Basra city (48.7%) (3). However the exposure to physical violence for this study was (28.9%) which was higher than what was reported in previous study in Basra city (24.6%) (3), regarding the episodes of violence (73.6%) of the sample in this study exposed to about four times or more attacks of violence higher than the result of study done in Jordan (27.0%) (13). Relatives of the patients were the major source of violence 86.8% in this study slightly lower than the study in Chinese (93.5%) (8), and higher the study in Saudi Arabia (71.7%) (6) and similar to study in Iran (15). In this study working night shifts violent incidents was (48.7%), lower than result of study done in Turkey (67.4%) and Egypt (60.9%) (18,19). While in other studies (2,3) the day time shifts was associated with more violent incidents.

About one fifth of nursing staff in this study, reported the violent incidents, similar to study in Egypt (19), and lower than reports of studies elsewhere (2,3). The main reason for not reporting the incident of violence was they consider it of not important (76.3%), higher than reports in study done in Iran, Jordan and Basra (2,3). Nothing was done as consequences in (35.3%) of the work place violence, which was higher than the study in Iran (21.1%) (11) and lower than that for Egypt (19).

Disappointment and sadness were expressed by (32.8%) and (15.8%) of nurses and these rates were lower than other studies (18).

CONCLUSIONS

1. workplace violence was prevalent, verbal violence was more prevalent than physical violence.
2. Males exposed to violence more than females
3. Older age groups exposed to violence more than younger age groups
4. Relatives of the patients were the main source of violence.
5. Violence usually occur during night shifts
6. The majority of those who exposed to workplace violence didn’t submit violence report

RECOMMENDATIONS

1. Design and implementation of an educational programs on how to manage the incident of workplace violence.
2. legislations need to be activated to protect health staff in general and specifically the emergency units staff

Conflict of Interest: Nil

Source of Funding: Self-funding

Ethical Clearance: Taken from Basra Nursing College ethical and scientific committee.

REFERENCES


Implementation E-Health System on Use Behavior Customer based on Unified Theory of Acceptance and Use of Technology (Utaut)

Farouk Ilmid Davik1, Nurus Sa’idah2, Muhammad Ardian C.L3, Djazuly Chalidyanto4

1Master Student of Administration and Health Policy, Airlangga University, Surabaya, Indonesia, 2Human Resources Development Husada Hospital, Sidoarjo, Indonesia, 3Medical Service Manager Airlangga University Hospital, Surabaya, Indonesia, 4Lecture Faculty of Public Health, Airlangga University, Surabaya, Indonesia

ABSTRACT

Surabaya is a pioneer of E-Health innovation in Indonesia by providing online registration system to facilitate to take a queue number anytime anywhere. The user online registration at RSUD dr.M. Soewandhie Surabaya is the largest, but dissatisfaction figure of online registration services reached 31.4%. Therefore, the purpose of this research is to analyze use behavior online registration at RSUD dr.M. Soewandhie based on Unified Theory of Acceptance and Use of Technology (UTAUT). This research was an analytic observational with quantitative approach and cross sectional design. Sample were collected by systematic random sampling and consist of 50 users and 50 nonusers. The result showed that individual characteristic which has p value below 0.05 was experience, knowledge and IT skills. Performance expectancy (p = 0.044) significantly influence behavioral intention, whereas effort expectancy (p = 0.124) do not. Facilitating condition (p = 0.812) and behavioral intention (p=0.189) had no influence with use behavior because p value was above 0.05. In conclusion, performance expectancy has a significant influence with behavioral intention, therefore experience, knowledge and IT skills had influence with use behavior online registration in RSUD dr.M. Soewandhie Surabaya.

Keyword: E-Health, Online registration, Unified Theory of Acceptance and Use of Technology, Use behavior

INTRODUCTION

Global health services are considered as the largest priority service industry and a huge investment that is growing rapidly in most countries. E-health or electronic health is one of innovations undertaken to overcome these obstacles. E-Health essentially driven by the use of information and communication technologies (ICT) for health[2]. WHO encourages each country to develop long-term strategic plans to develop E-Health services in various health fields for health administration, legal and regulatory framework, also public and private partnership infrastructure mechanisms.

E-Health Innovation in Indonesia is pioneered by Surabaya City Government with the aim of making it easy for people to come to Puskesmas and hospitals to register online. So, there is no more long queues occur and the patients can estimate the time to come to health facilities as they wish.

The example of e-Health application in Surabaya City is online registration system with the aims to facilitate the people who will come to the Puskesmas or Government Hospital to registered by online.
Based on online queue at www.surabaya-ehealth.com, the enthusiasm of Surabaya society in using the online registration system is quite high the following are the five government-owned health facilities with the highest online queue users in March 2016 presented in Table 1.

Table 1. The big five of health care facilities with the highest number of online registration user in Surabaya 2016

<table>
<thead>
<tr>
<th>No.</th>
<th>Health Facilities</th>
<th>Users Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>RSUD dr. M. Soewandhie</td>
<td>3069</td>
</tr>
<tr>
<td>2.</td>
<td>Puskesmas Jagir</td>
<td>1009</td>
</tr>
<tr>
<td>3.</td>
<td>Puskesmas Ketabang</td>
<td>703</td>
</tr>
<tr>
<td>4.</td>
<td>RSUD Bhakti Dharma Husada</td>
<td>326</td>
</tr>
<tr>
<td>5.</td>
<td>Puskesmas Simomulyo</td>
<td>231</td>
</tr>
</tbody>
</table>

(Sumber: website surabaya-ehealth, 2016)

In Table 1 it can be seen that online registration system in RSUD dr. M. Soewandhi runs with an average user 154 people per day. RSUD dr. M. Soewandhi has E-Kios machine facility connected to e-health online registration website, so that the patients can choose to do online registration through e-kios or manually by taking the queue number provided in hospital.

Researchers collected the initial data by survey on 35 users of E-Kiosk machine and obtain that equal to 68.6% online registration users with E-Kios machine was satisfied. While 31.4% of users are not satisfied when using the E-Kios machine. Respondents’ reason for their dissatisfaction is because sometimes E-Kios machine is error and the connection is slow, besides the instruction of machine is not easy to be understood by some people so they need help from officer or other user. So it is necessary to do a research to evaluate the attitude of public acceptance in using online registration system facility to avoid online registration system users getting low.

Venkatesh suggested that user acceptance of a new information system is influenced by various factors so that a model called Unified Theory of Acceptance and Use of Technology (UTAUT) is developed. This study aims to analyze the users behavior of online registration system (E-Health) in dr. M. Soewandhi Surabaya that has been running for more than one year. It is hoped that with the use of UTAUT model, this research can determine the influence of factors in the model[3].

MATERIAL AND METHOD

This research is an analytic observational research by using cross sectional research. The research was held in RSUD dr. M. Soewandhi Surabaya. The time of this research is conducted for two months. The population in this study is the people who visited RSUD dr. M. Soewandhi Surabaya with an average visit of 2774 people per month. Sample of this study was 100 people who divided into two groups, the user group of 50 people and the non-user group of 50 people.

The sampling technique used is simple random sampling. Primary data obtained using survey method by giving questionnaire which is modification of research[3]. The statistical test is conducted to see the effect of independent variable consist of individual characteristic, performance expectancy, effort expectancy, social influence and facilitating condition. Dependent variable of this research is use behavior and behavioral intention.

FINDINGS

Characteristics of respondent

Characteristics of respondents assessed in this study are age, sex, education, job, experience, knowledge of E-health, and IT skills. Based on the results in table 2 shows that the age of respondents in the non-user group and users group of online registration is about ≥ 51 years old.

Age can affect a person in using health services because age differences have different risk of illness[5]. So most users of health services in RSUD dr. M. Soewandhie is elderly with age category about ≥ 51 years old.
Table 2. Characteristics of respondents who used in RSUD dr. M. Soewandi Surabaya 2017

<table>
<thead>
<tr>
<th>Characteristics of Respondents</th>
<th>User Group</th>
<th>Non User Group</th>
<th>Total</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20 years old</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>21-35 years old</td>
<td>10</td>
<td>20</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>36-50 years old</td>
<td>13</td>
<td>26</td>
<td>17</td>
<td>34</td>
</tr>
<tr>
<td>&gt; 51 years old</td>
<td>26</td>
<td>52</td>
<td>19</td>
<td>38</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>31</td>
<td>62</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>Male</td>
<td>19</td>
<td>38</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>Last education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>6</td>
<td>12</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Junior high school</td>
<td>10</td>
<td>20</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Senior high school</td>
<td>20</td>
<td>40</td>
<td>22</td>
<td>44</td>
</tr>
<tr>
<td>Bachelor</td>
<td>14</td>
<td>28</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Job</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Servent</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Private employees</td>
<td>13</td>
<td>26</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>Housewife</td>
<td>20</td>
<td>40</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>4</td>
<td>8</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Et all</td>
<td>10</td>
<td>20</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>29</td>
<td>58</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Sufficient</td>
<td>18</td>
<td>36</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Low</td>
<td>3</td>
<td>6</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>IT experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>39</td>
<td>78</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Less good</td>
<td>11</td>
<td>22</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>1-3 time(s)</td>
<td>28</td>
<td>56</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4-6 times</td>
<td>7</td>
<td>14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>&gt;6 times</td>
<td>15</td>
<td>30</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Most of respondents are female. The education level of respondents is mostly high school, university and junior high school with majority of work as housewife. In online registration users group mostly have a high knowledge of E-Health and have a good IT skills. While the majority of non-user groups have a sufficient level of E-Health knowledge and IT skills with 50% percentage good and 50% less good.
The test results of factors that influence the characteristics of user’s use behavior there are three variables that have $p < 0.05$ those are experience, IT skills and knowledge of E-Health. It can be concluded that experience variables, IT skills and knowledge significantly influence the use behavior of online registration users. Ability is the capacity of the individual to do the various tasks they receive. IT capabilities required in operating e-kios machine is browsing the Internet and use of electronic devices based on touch screen. So users with high IT capabilities can influence the use of online registration system.

The one of important individual characteristics in individual acceptance is the experience of using similar products before. This means that users with high experience have great individual acceptance. In addition to experience factors, knowledge is one of the predisposing factors for behavior\[^{7}\]. The better knowledge of E-Health users have, the easier it is to register online.

### Table 3. Use Behaviour Customer Based Unified Theory of Acceptance and Use of Technology to Implementation E-health System in RSUD dr.M. Soewandi Surabaya 2017

<table>
<thead>
<tr>
<th>Characteristics of Respondents</th>
<th>User Group</th>
<th>Non User Group</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>%</td>
<td>$N$</td>
</tr>
<tr>
<td><strong>Performance Expectancy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not good</td>
<td>4</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Good</td>
<td>46</td>
<td>92</td>
<td>48</td>
</tr>
<tr>
<td><strong>Effort Expectancy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not good</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>48</td>
<td>96</td>
<td>46</td>
</tr>
<tr>
<td><strong>Social Influence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Influenced the social environment</td>
<td>13</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>Influenced the social environment</td>
<td>37</td>
<td>74</td>
<td>37</td>
</tr>
<tr>
<td><strong>Facilitating Conditions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not good</td>
<td>11</td>
<td>22</td>
<td>12</td>
</tr>
<tr>
<td>Good</td>
<td>39</td>
<td>78</td>
<td>38</td>
</tr>
<tr>
<td><strong>Behavioral Intention</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>10</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>High</td>
<td>40</td>
<td>80</td>
<td>45</td>
</tr>
</tbody>
</table>

**Performance expectancy**

Performance expectancy is a level of confidence in using technology can improve the person’s performance. There are four indicators, they are the perception of the benefits, increase satisfaction, save time and provide benefits. That mostly user groups provide good assessment with 92% percentage while non user group is 96%. The results of user and non-user ratings of performance expectancy are good categories. So it can be concluded that the respondents of user groups and non users group feel that the benefits of E-Health can simplify the registration process. Based on the result of statistical test, performance expectancy variable have value ($p < 0.05$) means that it gives significant influence to behavioral intention.

**Effort Expectancy**

Effort Expectancy is the perception of ease associated with the use of technology level, while the indicators used in the assessment are ease of visit planning, machine operation, ease of learning and speed of service compared to manual. Mostly user groups of
96% and non-user groups 92% gave good ratings. So that respondents feel that the use of online registration can provide convenience in obtaining services in the hospital.

The ease of use of a system will affect the intention to use the system\[6\]. This study found different result that is effort expectancy has p>0,05 so it does not give significant effect to behavioral intention. The examines user acceptance in analyzing and designing a system also finds insignificant influence between effort expectancy and behavioral intention\[6\].

**Social Influence**

Assessment of social influence can determine the degree to which the individual feels influenced by the social environment in using the technology can be assessed with three indicators, they are the use of seeing other people, the use of being told by others and the belief in helping others when experiencing the difficulties in operating technology. In the table above can be seen that the majority of user groups and non-user groups have affected the social environment with a percentage of 74%.

The results of this study are in line with this statement because user and non-user groups assess that they are affected by the social environment in decision making use of e-health. However, the statistical count with the influence test results obtained p>0,05 so that the social influence variable does not significantly influence the behavioral intention.

**Facilitating Condition**

The conditions that facilitate users in using information technology systems is one of the factors that affect the utilization of information technology systems. Indicators used in the assessment of facilitating conditions include the physical appearance of the E-Kios machine, internet connection, clear menu display and queuing printing process. Most user groups provide good ratings with 78% percentage while non user group is 76%. However, based on the statistical test the effect of facilitating condition variable on the use behavior has p>0,05 so the facilitating condition variable has no effect on use behavior. UTAUT theory constructing facilitating conditions when moderated by age and experience will have a significant effect on use behavior\[1\].

**Behavioral Intention**

Behavioral Intention is the power of one’s intention to perform certain behaviors, including the desire to use in the next opportunity to give positive comments and recommend technology to others. The majority of non-user groups have high intentions by the percentage of 90%. Furthermore, 10% of non-user groups have low intentions. In high-intention category, users have a percentage of 80% and low-intention categories of 20%. The result of statistical test shows that p>0,05 so it can be concluded that behavioral intention does not affect the use behavior.

The results are not in line with the theory of UTAUT and which states that behavioral intention affect the use behavior. This can be due to the implementation of online registration has not been implemented optimally because some applicants choose to use the manual way\[8\].

**CONCLUSION**

The results showed that the characteristics of respondents who influence the use of E-Health are the experience, knowledge and IT skills. While the factor which influence the behavior intention of the use of online registration is performance expectancy. So respondents who consider to use online registration can increase the satisfaction, profit and time savings waiting. Surabaya City Government can use the results of this research to optimize the implementation of online registration system or E-Health. The suggestions that can be given are the government needs to do some socialization about the advantages of online registration to the community through an interesting media so it is expected to increase knowledge and foster the interest of the community to register online.

**Conflict Interest:** There is no conflict of interest

**Source Funding:** Independent

**Committee Ethical Clearance:** Faculty of Public Health, Airlangga University, Indonesia

**REFERENCES**


A descriptive study was carried out at the surgical wards of Al-Sadder Teaching Hospital started from 2nd August to 2nd December, 2016. The study aims to assess nurse’s practice concerning postoperative wound care, and to identifying the relationship between nurse’s practice and their demographic characteristic.

A Purposive “non-probability” sample consisting of (25) nurses was selected from Al-Sadder Teaching Hospital. The data were collected through the use of direct observation, which comprised of (19) items as mean of data collection. The data were analyzed through the application of descriptive statistical analysis that include frequency and percentage, the application of inferential statistics that including the mean of score, and Chi-square test.

The majority of the nurses were males (60%), with age group (25-29) years old (28%), nursing institute graduate (48%), the majority of nurses have than less (1-5) years of experience (44%). The result indicated that there were no significant associations between the nurse’s gender, age, level of education and their practice. There were significant associations between the nurse’s years of experience and their practice.

The results demonstrated a practice deficit in the most items of post-operative clean wound care for patient in surgical units.

Special training sessions should be designed and presented to these nurses, developing assessment sheet for skills and daily nursing note for post-operative wound care.

**Keyword:** Nurses Practice, Concerning Postoperative, Clean Wound dressing

**INTRODUCTION**

The skin, the body’s first line of defense, protecting the underlying structure from invasion by organisms(1). Maintaining an intact skin surface is important because a break or disruption in this integrity is potentially dangerous and possibly life threatening(2). Maintenance of skin integrity and promotion of wound healing are important aspects of nursing care in all care setting(3). A wound is a disruption of normal anatomical structure and function that results from pathological process beginning internally or externally to the involved organs(4). The goal of wound care is to promote tissue repair and regeneration so that skin integrity is restored(5). Wound can be treated by leaving them to air; no dressing (protective covering placed over a wound) is applied(1). The wound is believed to be at risk for infection development related to the drying of the wound, resulting in less bacterial growth(2).

Dressings are important component of postoperative wound management. A good dressing should maintain a moist wound environment and thus promote wound healing, be able to remove excessive exudate that might lead to maceration of the wound, provide a good barrier against bacterial or fluid contamination, and be adherent to the skin but a traumatic on removal(6). The nurses play an important role in the therapeutic success and outcome of the patient because minimize the patient risk factor for infection through maintaining strict aseptic technique, inspecting the solution for signs of contamination, monitoring the patient closely before, during and after an exchange and recording his vital signs (7).
Furthermore surgical site infection (SSI) is usually associated with increased hospital stay, coast and lethality, because of that knowledge of the main risk factors for this type of infection is crucial for the establishment preventive measures regarding modifiable risk factors (8).

Many nosocomial infections are caused by pathogens transmitted from one patient to another by way of health care workers (HCW) who have not washed their hands between patients or (HCWs) who do not practice control measures such as use of hand disinfection, glove use etc (9).

The Importance of the current study can be showed through that according to the international committee on wound management. Today wound infection increased the financial cost on the patients, increase the use of antibiotics, increase in the consumption of medical supplies and increase of time consuming for personnel in the health sector (10).

The postoperative wound infection was considered the most important health problem in Iraq hospitals. In spite of restricted policies and procedures related to disinfection and sterilization techniques, as well as following the appropriate management as noted in terms of patient’s preparation preoperatively and through the surgery, therefore the importance of the standardized methods to wound care showed in this research paper lies in the fact that it can be successfully applied to all types of surgical wounds.

**METHOD**

A descriptive design was conducted on the surgical wards in AL-Sader Teaching Hospital started from August 2th to December 2th, 2016 in order to assess nursing practice concerning postoperative wound care for patients.

A probability sample of (25) nurses males and females, who were in the surgical wards and intensive care units. The nurses were assigned for the study according to; there working at the surgical wards and who should have one year of experience and more. A questionnaire format was used for data collection, which consisted of (2) parts. The overall number of the items included in the questionnaire was (19). The items were rated on three level liker scale: always, some time, and never and scored as 3, 2, and 1, respectively, cutoff point was (2). The first part of the questionnaire sheet included (4) items relative to the deogra-phi-c data of the nurses who work in the surgical wards and intensive care unit and included: age, gender, level of education, years of experience.

The second part of the questionnaire was comprised (19) items that concerned with nurses practice relative postoperative clean wound care. Data were collected through direct observation with the nurses of the sample by using Descriptive statistical procedure (Frequency (F) and percentage (%)) and Inferential statistical procedure (Mean of score and Chi-square (X²) test) in analyzing the data of the study. The mean of score, which was equal to (2), was considered significant if greater than (2) and less than (2) was considered non-significant. Chi-square was used to determine the significant relationship between the nurse’s practice and their demographic characteristics at p≤ 0.05.

**RESULT OF THE STUDY**

**Table 1: Distribution of nurses by their demographic data.**

<table>
<thead>
<tr>
<th>Gender</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>15</td>
<td>60%</td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>40%</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>4</td>
<td>16%</td>
</tr>
<tr>
<td>25-29</td>
<td>7</td>
<td>28%</td>
</tr>
<tr>
<td>30-34</td>
<td>4</td>
<td>16%</td>
</tr>
<tr>
<td>35-39</td>
<td>4</td>
<td>16%</td>
</tr>
<tr>
<td>40-44</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>45 &amp; over</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of education</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary nursing school</td>
<td>9</td>
<td>36%</td>
</tr>
<tr>
<td>Nursing institute graduate</td>
<td>12</td>
<td>44%</td>
</tr>
<tr>
<td>Nursing college graduate</td>
<td>4</td>
<td>16%</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of experience</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 5</td>
<td>11</td>
<td>44%</td>
</tr>
<tr>
<td>6 – 10</td>
<td>8</td>
<td>32%</td>
</tr>
<tr>
<td>11 – 15</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>15 – &amp; over</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100%</td>
</tr>
</tbody>
</table>
This table reveals that the majority of the sample were males (60%), (25-29) years old (28%), nursing institute graduate (48%), (1-5) years of experience (44%).

Table 2: Mean of scores of the nurse’s practice concerning post-operative wound care.

<table>
<thead>
<tr>
<th>Items</th>
<th>always</th>
<th>Some time</th>
<th>never</th>
<th>Ms</th>
<th>Rs</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Warmed irrigant or solution.</td>
<td>3</td>
<td>2</td>
<td>20</td>
<td>1.4</td>
<td>46.66</td>
<td>Inadequate</td>
</tr>
<tr>
<td>2 Performed hand hygiene.</td>
<td>10</td>
<td>7</td>
<td>8</td>
<td>2.8</td>
<td>93.32</td>
<td>adequate</td>
</tr>
<tr>
<td>3 Prepared waterproof bag.</td>
<td>20</td>
<td>2</td>
<td>3</td>
<td>2.68</td>
<td>95.32</td>
<td>adequate</td>
</tr>
<tr>
<td>4 Provided privacy.</td>
<td>6</td>
<td>4</td>
<td>15</td>
<td>1.64</td>
<td>54.66</td>
<td>Inadequate</td>
</tr>
<tr>
<td>5 Applied gown and goggles, if needed.</td>
<td>7</td>
<td>4</td>
<td>14</td>
<td>1.72</td>
<td>57.32</td>
<td>Inadequate</td>
</tr>
<tr>
<td>6 Put on cleans gloves, removed and discarded soiled dressing.</td>
<td>19</td>
<td>1</td>
<td>5</td>
<td>2.56</td>
<td>85.32</td>
<td>adequate</td>
</tr>
<tr>
<td>7 Prepared equipment and opened sterile supplies.</td>
<td>4</td>
<td>9</td>
<td>12</td>
<td>1.68</td>
<td>55.99</td>
<td>Inadequate</td>
</tr>
<tr>
<td>8 Applied sterile gloves.</td>
<td>4</td>
<td>-</td>
<td>21</td>
<td>1.32</td>
<td>43.99</td>
<td>Inadequate</td>
</tr>
<tr>
<td>9 Obtained necessary culture.</td>
<td>-</td>
<td>-</td>
<td>25</td>
<td>1</td>
<td>33.33</td>
<td></td>
</tr>
<tr>
<td>10 Applying clean draw sheets around the patient’s site of dressing.</td>
<td>-</td>
<td>3</td>
<td>22</td>
<td>1.12</td>
<td>37.32</td>
<td>Inadequate</td>
</tr>
<tr>
<td>11 Irrigate the wound.</td>
<td>3</td>
<td>2</td>
<td>20</td>
<td>1.32</td>
<td>43.99</td>
<td>Inadequate</td>
</tr>
<tr>
<td>12 Dried wound edges with sterile gauze.</td>
<td>4</td>
<td>6</td>
<td>15</td>
<td>1.56</td>
<td>51.99</td>
<td>Inadequate</td>
</tr>
<tr>
<td>13 Assess the wound.</td>
<td>4</td>
<td>3</td>
<td>18</td>
<td>1.44</td>
<td>47.99</td>
<td>Inadequate</td>
</tr>
<tr>
<td>14 Assisted client to comfortable position.</td>
<td>7</td>
<td>9</td>
<td>9</td>
<td>1.92</td>
<td>63.99</td>
<td>Inadequate</td>
</tr>
<tr>
<td>15 Applied appropriate dressing.</td>
<td>13</td>
<td>7</td>
<td>5</td>
<td>2.32</td>
<td>77.32</td>
<td>adequate</td>
</tr>
<tr>
<td>16 Disposed of used equipment.</td>
<td>3</td>
<td>6</td>
<td>16</td>
<td>1.48</td>
<td>49.32</td>
<td>Inadequate</td>
</tr>
<tr>
<td>17 Removed gloves, gowns and goggles.</td>
<td>7</td>
<td>1</td>
<td>17</td>
<td>1.6</td>
<td>53.32</td>
<td>Inadequate</td>
</tr>
<tr>
<td>18 Performed hand hygiene.</td>
<td>5</td>
<td>2</td>
<td>18</td>
<td>1.48</td>
<td>49.32</td>
<td>Inadequate</td>
</tr>
<tr>
<td>19 Documentation.</td>
<td>2</td>
<td>3</td>
<td>20</td>
<td>1.28</td>
<td>42.66</td>
<td>Inadequate</td>
</tr>
</tbody>
</table>

The findings of this table indicate that the nurses have adequate practice concerning post-operative care on items 2, 3, 6, & 15 and inadequate on the remaining items.

Table 3: Association between nurse’s practice and their gender.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Always</th>
<th>Sometime</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>266</td>
<td>209</td>
<td>172</td>
<td>647</td>
</tr>
<tr>
<td>%</td>
<td>59.79%</td>
<td>44.95%</td>
<td>64.66%</td>
<td>100%</td>
</tr>
<tr>
<td>Female</td>
<td>55</td>
<td>39</td>
<td>172</td>
<td>266</td>
</tr>
<tr>
<td>%</td>
<td>20.68%</td>
<td>14.66%</td>
<td>64.66%</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>71</td>
<td>284</td>
<td>475</td>
</tr>
<tr>
<td>%</td>
<td>25.26%</td>
<td>14.95%</td>
<td>59.79%</td>
<td>100%</td>
</tr>
</tbody>
</table>

$X^2$ calculated = 4.33  $df$= 2  $X^2$ tabulated= 5.991  P > 0.05

The findings of this table presented that there were no significant associations between the nurse’s gender and their practice.
Table 4: Association between nurse’s practice and their age.

<table>
<thead>
<tr>
<th>Age</th>
<th>Always</th>
<th>Sometime</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>F</td>
<td>83</td>
<td>23</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>44.38%</td>
<td>12.31%</td>
<td>43.31%</td>
</tr>
<tr>
<td>30-39</td>
<td>F</td>
<td>19</td>
<td>28</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>12.5%</td>
<td>18.42%</td>
<td>69.08%</td>
</tr>
<tr>
<td>40-49</td>
<td>F</td>
<td>21</td>
<td>17</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>15.55%</td>
<td>12.59%</td>
<td>71.86%</td>
</tr>
<tr>
<td>Total</td>
<td>F</td>
<td>123</td>
<td>68</td>
<td>283</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>25.94%</td>
<td>14.34%</td>
<td>59.72%</td>
</tr>
</tbody>
</table>

$X^2_{calculated} = 8.40$  $df= 10$  $X^2_{tabulated}= 18.307$  $P > 0.05$

The finding of this table revealed that there were no significant associations between the nurse’s age and their practice.

Table 5: Association between nurse’s practice and their level of education.

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Always</th>
<th>Sometime</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary nursing school</td>
<td>F</td>
<td>21</td>
<td>20</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>12.28</td>
<td>11.69</td>
<td>76.03</td>
</tr>
<tr>
<td>Nursing institute graduate</td>
<td>F</td>
<td>45</td>
<td>40</td>
<td>143</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>19.74</td>
<td>17.54</td>
<td>62.72</td>
</tr>
<tr>
<td>College of nursing</td>
<td>F</td>
<td>55</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>72.36</td>
<td>14.48</td>
<td>13.16</td>
</tr>
<tr>
<td>Total</td>
<td>F</td>
<td>121</td>
<td>71</td>
<td>183</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>32.26</td>
<td>18.93</td>
<td>48.81</td>
</tr>
</tbody>
</table>

$X^2_{calculated} = 3.72$  $df= 4$  $X^2_{tabulated}= 9.488$  $P > 0.05$

The finding of this table presented that there were significant associations between the nurse’s level of education and their practice.

Table 6: Association between nurse’s practice and their years of experience.

<table>
<thead>
<tr>
<th>Years of experience</th>
<th>Always</th>
<th>Sometime</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-9</td>
<td>F</td>
<td>77</td>
<td>25</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>38.69</td>
<td>12.56</td>
<td>48.75</td>
</tr>
<tr>
<td>10-19</td>
<td>F</td>
<td>21</td>
<td>29</td>
<td>101</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>13.90</td>
<td>19.20</td>
<td>66.88</td>
</tr>
<tr>
<td>20&amp; more</td>
<td>F</td>
<td>13</td>
<td>16</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>10.53</td>
<td>10.53</td>
<td>78.94</td>
</tr>
<tr>
<td>Total</td>
<td>F</td>
<td>111</td>
<td>70</td>
<td>283</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>23.93%</td>
<td>15.08%</td>
<td>60.99%</td>
</tr>
</tbody>
</table>

$X^2_{calculated} = 20.72$  $df= 6$  $X^2_{tabulated}= 12.592$  $P < 0.05$

The finding of this table presented that there were significant associations between the nurse’s years of experience and their practice.
DISCUSSION OF THE RESULTS

A surgical wound is generally considered to be clean and as a result is often judged as less of clinical challenge than some other wound types(14).

The nursing care is a very important factor in patients’ satisfaction or dissatisfaction with their experiences in hospital, and nurses’ attitudes towards and communication with patients are the essential determinants of the patient satisfaction(15).

Throughout the course of the present study, it has noticed that the majority(60%) of the study sample was males. The highest proportion(28%) of them were(25-29)years old, concerning level of education, nursing institute graduate (48%), (1 -5) years of experience (44%).

Throughout the use of observational checklist the highly percentage of nurse’s have adequate practices in items concerning (2, 3, 6& 15). These findings are indicate that the postoperative wound care so patient may at risk of infections, that may sometimes lead to death.

Throughout the use of statistical analysis there were no significant relationships between nurse’s practices and their age, gender in surgical units(table 3,4), while they were high significant relationships between nurse’s practices and their level of education and years of experience(table 5,6) so nurses with low certification and inadequate skills cannot do difficulty responsibilities like good dressing for patients, this results agrees with the study conducted by Atiyah and Khudhur 2012 that found academic nurses had performed adequate practices relative to postoperative wound dressing than practical ones(16).

CONCLUSIONS

1. According to the findings of the study and their discussion, the researcher concluded that:

2. The majority of the study nurse were males (60%), (25-29) years old(28%), nursing institute graduate (48%), (1 -5) years of experience (44%).

3. The results demonstrated a practice deficit in the most items of post-operative wound care for patient in surgical units.

4. There is no significant relationship between age, gender and nurse’s practices about postoperative wound care for patient in surgical care units.

5. There is a significant relationship between level of education, years of experience and nurse’s practice about post-operative wound care for patient in surgical units.

RECOMMENDATIONS

1. Special training sessions should be designed and presented to these nurses.

2. Nurses should be provided with in-service education regarding nursing for postoperative wound care in surgical units.

3. A booklet should be designed and distributed to all nurse working in surgical units.

4. The study recommended developing assessment sheet for skills and daily nursing note for post-operative wound care.

The Source of Funding is self-approved by the University of Basra Nursing College

I have the statement in Arabic

The funding source is subjective

The Interest is a benefit for the Iraqi society, especially Basra society

REFERENCES


The Role of *Moringa Oleifera* Leaves Against Oxidative Stress and Chronic Inflammation: A Review

Kusmiyati¹, Soedjajadi Keman², Muhammad Amin¹, Suwarno⁴, Heru Santoso Wahito Nugroho⁵

¹Doctoral Program of Health Science, ²Faculty of Public Health, ³Faculty of Medicine, ⁴Faculty of Veterinary Medicine, Universitas Airlangga, ⁵Health Polytechnic of Ministry of Health at Surabaya

ABSTRACT

*M. oleifera* leaves are rich in nutrients, micromineral, macromineral and bioactive compounds such as polyphenols, flavonoids, tannins, alkaloids, and steroids. The contained compounds indicate their role in preventing diseases. A variety of studies have shown the effect of *M. oleifera* leaves as antioxidant and anti-inflammatory agent. *In vivo* studies in laboratory animals also have revealed its role in inhibition of inflammation and oxidation process induced by any exposures, resulting in prevention of oxidative stress and inflammation responses.

**Keywords:** Antioxidant, Inflammation, Oxidative stress, Moringa oleifera

INTRODUCTION

*Moringa oleifera* is a plant commonly found in tropical areas. Almost its parts could be used. This plant may grow and is distributed among many countries, such as India, Pakistan, Uzbekistan, Sri Lanka, China, Malaysia, Arab, Indonesia and other Asia and Africa countries⁴¹. *M. oleifera* leaves contain beneficial chemical compounds, nutrition, and minerals for body⁴². Antioxidant compounds of natural substances could give support in maintaining health or preventing degenerative diseases⁴³. Compounds in the leaves extract are tannins, steroids and triterpenoids, flavonoids, saponins, anthraquinones, alkaloids⁴⁴.

Uganda communities consume *M. oleifera* leaves to treat diseases such as hypertension, asthma, fever, allergy and diabetes⁴⁵. Both *in vitro* and *in vivo* studies have shown that *M. oleifera* possesses antioxidant⁴⁹, anti-inflammatory and immunomodulatory⁵⁰(⁵¹), hypolipidemic⁵⁰, antibacterial, wound healing⁵ and anticancer properties⁵⁰.

METHOD: The review focuses on *M. oleifera*, antioxidant and anti-inflammatory properties. All *in vitro* and *in vivo* study publications in animals met the inclusion criteria. We limit the resources included in this review to studies published during 2008-2017.

FINDINGS AND DISCUSSION

*M. oleifera* as antioxidant agent

Many factors may contribute to occurring oxidative stress in human such as food, environmental pollution and behavior. Development of disease also involves inflammation response which could influence oxidative stress. This article aims to provide description of the potential of *M. oleifera* as antioxidant and anti-inflammatory agent.

Corresponding author:
Heru Santoso Wahito Nugroho
Health Polytechnic of Ministry of Health at Surabaya
Jl. S. Parman No. 1 Magetan, Indonesia
E-mail: heruswn@gmail.com

DOI Number: 10.5958/0976-5506.2018.00560.0
Fe$^{2+}$ chelating activity\(^{(13)}\).

The imbalance between ROS and natural defense by antioxidant leads to oxidative stress. Human body has defense systems including primary antioxidant enzymes (superoxide dismutase, catalase, glutathione peroxide) and secondary antioxidants (glutathione reductase and glucose-6-phosphate dehydrogenase)\(^{(14)}\). The presence of tannins, flavonoids, steroids, terpenoids, alkaloids, and cardiac glycosides in methanolic extract of \textit{M. oleifera} leaves\(^{(13)}\). Previous studies have found phenolic compounds, flavonoids and alkaloid in small quantities\(^{(15),(16)}\). Ascorbic acids, sterols, isoquercetin glucoside, carotenes and kaempferitrin were also present\(^{(17)}\). In \textit{M. oleifera} leaves extract, \textit{total phenolic}, flavonoid and flavanol levels were found to be 120 mg/g of GAE, 40.5 mg/g of QE and 12.12 mg/g of QE, respectively. There are quercetin (89.8 mg/100 g fw), kaempferol (36.3 mg/100 gfw), isorhamnetin (2.9 mg/100 g fw), giving a total flavonoid level of 129 mg/100 gfw in \textit{M. oleifera} leaves\(^{(18)}\).

\textit{M. oleifera} leaves with different cultivars had varying quantities of flavonoid molecules\(^{(19)}\). Characterization (μg/g dry matter) of polyphenolic compounds contained in 80% methanolic extract of \textit{M. oleifera} leaves collected from San Pedro: gallic acid (49.074.53), chlorogenic acid (286.13), luteolin (44.562.03), rutin (603.3513.48), quercetin (46.180.6), kaempferol (46.432.14), apigenin (24.412.16). In Lombardia contained polyphenolic compounds (μg/dry matter): gallic acid (43.28, chlorogenic acid (479.53, luteolin (94.277.6), rutin (845.2518.83), quercetin (49.896.98), kaempferol (67.367.86) dan apigenin (8.740.95))\(^{(20)}\).

Total flavonoid level (CE g/100 g DW) of \textit{M. oleifera} leaves extracted with absolute ethanol using shaker and reflux extracting techniques were 5.33 and 4.19, respectively. Total flavonoid level of \textit{M. oleifera} leaves extracted with 80% ethanol using shaker and reflux extracting techniques were 6.21 and 5.31, respectively. Extraction with 80% ethanol and 80% methanol showed higher antioxidant activity than absolute ethanol and absolute methanol\(^{(20)}\). The results of subcritical ethanol extraction using 70% ethanol at 126.6 °C for 2.05 hours yielded the highest result of flavonoids. FRAP and DPPH assay showed that the extract had strong antioxidant and free radical scavenging activities\(^{(21)}\). Stage of maturity of leaves may affect the contained compounds. A study in India found total phenolic levels of 45.81 mg/g and total flavonoid levels of 27 mg/g for mature leaves extract. Total phenolic levels of 36.02 mg/g and total flavonoid levels of 15 mg/g were found in tender leaves extract\(^{(22)}\).

\textit{M. oleifera} leaves were also found to reduce levels of malondyaldehyde (MDA) induced by gamma irradiation\(^{(23)}\). Flavonoid compounds contained in the leaves were quercetin and kaempferol\(^{(19)}\). Quercetin had pneumoprotective effect, increased antioxidant status and reduced inflammatory cytokines production\(^{(24)}\). Antioxidant action can include suppression of ROS either by inhibition of enzymes or chelating trace elements involved in free radical generation, scavenging ROS, and upregulation or protection of antioxidant defenses\(^{(25)}\). Administration of extract of \textit{M. oleifera} leaves had a protective effect against α-irradiation-induced oxidative damage in rats\(^{(26)}\). Dose 100 mg/kg BW to Wistar rats for 10 days before treated with cadmium could improve liver function and prevent cadmium-induced liver damage\(^{(27)}\). In vitro, ethanol and aqueous as solvents at concentrations of 10, 50, 100, 250, 500, 1000 μg/mL, and in vivo experiment in mice at doses of 0.01, 0.1, 1, 10, 100 mg/kg showed antioxidant potential. Administration of extracts up to a dose of 100 mg/kg BW could still be tolerated due to showing no toxicity\(^{(28)}\). Antioxidant activity from both \textit{in vivo} as well as \textit{in vitro} studies suggested that the regular intake of its leaves through diet could protect diabetic patients against oxidative damage. The extracts could scavenge free radicals and exert a protective effect against oxidants, cause of cellular damage. \textit{In vitro} study showed that the leaves extract could also protect against oxidative injury induced by diabetes and enhance the activities of hepatic enzymes implicated in combating ROS\(^{(29)}\). Administration of ethanol extract (95%) at dose of 400 mg/kg BW in Wistar rats exposed to cement dust showed its antioxidant activity\(^{(30)}\).

\textit{M. oleifera} as anti-inflammatory agent

\textit{M. oleifera} could reduce the expression of proinflammatory cytokines in BALB/c mice model of atopic dermatitis\(^{(31)}\). Both polar and non-polar extracts could inhibit inflammatory responses in experimental models\(^{(32)}\). \textit{M. oleifera} contains polyphenols, phenolic acids, flavonoids, glucocinolates, tannins, saponins, oxalates and phytates\(^{(6)}\). At the early stage (10th week) has the highest carbohydrate level (55.14%), and mid stage (15th week) recorded the highest moisture (6.3%), the late stage (20th week) has highest protein level
The important mechanism for anti-inflammatory is inhibition of prostanoid biosynthesis, histamine release, phosphodiesterase, protein kinases and transcriptase activation. The most active flavonoid inhibitors of the TNF-α were 3,5,6,7,8,38,48-heptamethoxy flavone (HMF), 5-desmethylnobiletin, sinisetin, nobiletin and 5-hydroxy-3,6,7,8,38,48-hexamethoxy flavone. Inhibition of TNF-α occurred at the level of transcription. A number of hydroxylated flavones such as apigenin, kaempferol, rhamnetin, quercetin, and tamaracetin also moderately inhibited TNF-α. Clinicopathological examination of rats’ organ treated with oral M. oleifera at doses of 400, 800, and 1600 mg/kg showed no significant lesions, hence, concluded that the plant is relatively safe both for nutritional and medicinal uses. A study in Wistar mice model showed that M. oleifera is relatively safe when administered orally. However, study in human is expected to use standardized extract.

**CONCLUSION**

*M. oleifera* leaves may be considered as beneficial food materials to prevent many diseases, particularly those involving oxidative stress and inflammation.

**Conflict of Interest:** No

**Funding Source:** Authors.

**Ethical Clearance:** No (because not involve human).

**REFERENCES**


Induced Pulmonary Fibrosis in Wistar Rats. Pulmonary Medicine, 2013.


Exploration on Adolescent Knowledge Related Metabolic Syndrome (METS)

Nurhaedar Jafar1, Rahayu Indriasari1, Aminuddin Syam1, Yessy Kurniati2

1Lecturer, Nutrition Study Program of Hasanuddin University, Makassar, Indonesia, 2Lecturer, InaU Midwifery Academy, Makassar, Indonesia

ABSTRACT

Increased incidence of obesity in adolescence causes the incidence of Metabolic Syndrome (Mets) also tends to increase. Various studies conducted in several countries prove it. Proven nutritional education can be one way to prevent the Mets incidence in adolescents. But before doing education about Mets in adolescents, it is necessary to know about knowledge and practice of adolescent behavior related Mets. So this research is done to explore it. This study used qualitative research with focus group discussion (FGD) method to understand in depth what is understood by adolescent about Mets component. FGD was conducted by 5 facilitators using the standardized FGD guidance. FGD participants consisted of 32 participants, with details of 9 men and 32 women. The procedure is performed through the analysis of the FGD results that have been done. The results of the analysis are described in the form of data description. To get a detailed picture of the theme studied, researchers enrich the knowledge by deploying the literature related to adolescents, balanced nutrition and adolescent. The results showed that most of the respondents still had low knowledge about the Mets component and nutrition guidelines. Their knowledge is still what is common in society. Most are still far from expectations. This study concludes that the adolescent knowledge and behavior about Mets are still very low so it needs to do education related to it to prevent the occurrence of Mets in adolescents.

Keywords: adolescence, balanced nutrition, metabolic syndrome, knowledge, behavior

INTRODUCTION

There are several risk factors of Mets in adolescents. But lifestyle risk factors such as diet / diet are wrong, lack of physical activity and increased sedentary activity are major risk factors. Based on the results of the analysis was the composition of food intake effect on the incidence of Mets in adolescents with a coefficient value of 0.563 (p <0.05). The positive coefficient value indicates that the more intake of food, then the occurrence of Mets is also increasing. The indicator of the food intake composition that has the highest value is total calories followed by subsequent fat carbohydrates. Mets is also associated with a diet quality score. Similarly, it was found in the study of the relation between food quality score and the Mets component at Hasanuddin University and Ibn Sina Hospital, found that there was a significant relationship between food quality scores with HDL and triglyceride levels, hypertension and Mets events in outpatients

Consumption of vegetables and fruits in adolescent obesity is also still low. Studies conducted on obese students at Hasanuddin University found that although the knowledge and attitudes of the respondents were in good category, but the consumption patterns of vegetables and fruit of the respondents were still less than the standard of balanced nutrition

Jaaskeleinen, et al found that the risk of overweight/obesity was lower in adolescents who had regular diet 5 times a day. Mets risk is lower in adolescents who have regular breakfast, compared to those who skip breakfast in the morning. Pan, et al. (2008) found that Mets was more common in adolescents with lower physical activity (4.3%) than moderate (3.1%) and higher (2.6%) adolescents. Mark, et al, found that watch time was associated with increased risk of Mets
in adolescents\textsuperscript{5}. McMurray et al. (2008) found that adolescents with Mets were 6.08 times less likely to have aerobic exercise at a time and 5.16 times had low levels of physical activity\textsuperscript{6}.

Nutritional education has proven to be reliable for improving Mets risk factors in adolescents\textsuperscript{7}. Kurniati who saw the effectiveness of nutrition education to change the lifestyle of obese students at Hasanuddin University found that there was a change of vegetable and fruit consumption and fast food in the intervention group\textsuperscript{8}. But before doing education about Mets in adolescents, it is necessary to know about knowledge and practice of adolescent behavior related Mets. So this research is done to explore it

**MATERIAL AND METHOD**

This study used qualitative research with focus group discussion (FGD) method to understand in depth what is understood by adolescent about metabolic syndrome component. FGD was conducted by 5 facilitators using the standardized FGD guidance. FGD participants consisted of 32 participants, with details of 9 men and 23 women. Procedures were performed through the analysis of the FGD results that have been done. The results of the analysis are described in the form of data description. To get a detailed picture of the theme under study, researchers enrich their knowledge by deploying youth related literature, balanced nutrition and metabolic syndrome

**RESULTS AND DISCUSSION**

1. **Knowledge About the Components of METS**

a. **High blood pressure**

Most respondents know about the causes of high blood pressure, such as consuming too much Na (salty food) and fat. But there is also a claim that the cause of high blood pressure is due to many thoughts, lack of sleep, stress and headache. According to respondents, symptoms of a person affected by hypertension are blurred vision and often feel tense in the neck. High blood pressure is one indicator of Mets, which not only causes left ventricular hypertrophy, but also progressively can lead to the process of atherosclerosis of blood vessels. Hypertension is a condition in which blood pressure rises beyond the normal limit. Normal blood pressure limit varies according to age. Various factors can trigger the occurrence of hypertension, notwithstanding most (90%) causes of hypertension is unknown (essential hypertension). The cause of increased blood pressure is an increase in heart rate, increased resistance (resistance) of the vessels associated with the occurrence of hypertension through several mechanism. This will trigger the heart to increase its pulse so that blood flow can reach all parts of the body\textsuperscript{9}.

b. **Obesity / Obesity**

Most of the respondents in this study already know about obesity and its causes but still not very understand. In addition to the knowledge of respondents still misunderstanding so need to be straightened out. According to obese respondents are excess nutrients or over the limit that should be. The cause of obesity is eating too much sweet and fatty. But there are also respondents who stated that obesity is due to heredity and rarely exercise. In addition, obesity is also caused because the digestion is not good. There is also a claim that the cause of obesity is often to drink cold water so that the fat in his body froze. According to Dariyo (2004) obesity is the condition with having excess of body fat\textsuperscript{10}. Clinically obesity can be identified by the presence of distinctive signs and symptoms, including rounded face, chubby cheeks, double chin, relatively short, bulging chest with enlarged breasts containing fat tissue, bloated belly and abdominal wall multiples, both inner groin attached to each other cause lacerations and ulcerations that can cause unpleasant odors. In boys the penis appears small because it is buried in supra-pubic fat tissue\textsuperscript{11}.

c. **Hypercholesterolemia**

Most respondents say that hypercholesterolemia is experienced by the elderly and is caused by an unhealthy diet. Cholesterol is the bad fats in that blood. But there are also respondents who can answer the notion of hypercholesterol with the correct increase of cholesterol levels in the blood. The cause of hyperkolerterol according to the respondent is due to fatty foods and Metsoking habits as well as eating patterns are wrong and irregular. Dyslipidemia is a lipid metabolism disorder characterized by abnormal levels of plasma lipid fractions in the form of increased total cholesterol fractions, LDL cholesterol and triglycerides and decreased HDL cholesterol levels. Including atherogenic dyslipidemia in the WHO Mets criteria and NCEP ATP III are high triglycerides and low HDL cholesterol levels\textsuperscript{8}.
2. Knowledge of Eating Patterns in Adolescents

a. The Low Consumption of Fruit Vegetables

Most respondents stated that what makes teenagers do not like to eat vegetables is because it tastes bad, looks unattractive, unavailable at home, expensive, and some are affected because of the negative news about vegetables. For example vegetables are contaminated with pesticides and worms. In general, vegetables and fruits are a source of various vitamins, minerals, and dietary fiber. Some vitamins, minerals contained in vegetables and fruits play an antioxidant or an antidote to harmful compounds in the body. Various studies show that consumption of vegetables and fruits is enough to play a role in maintaining normal blood pressure, blood sugar and cholesterol levels. Consumption of enough vegetables and fruits also reduce the risk of constipation and obesity. This indicates that consumption of vegetables and fruits are sufficient to play a role in the prevention of non-communicable diseases chronic. Consume enough vegetables and fruits is one of the simplest indicators of balanced nutrition.

b. Skipping breakfast

According to the respondent the cause of teenage is not breakfast is his home away, rush, late wake up and many tasks, not get make breakfast and do not like breakfast. In addition, there are also states that breakfast makes teenagers nauseous and sleepy. Breakfast is essential to prevent obesity which is a major component of Mets. Breakfast is a meal and drinking activity between waking up to 9 am to meet some of the daily nutritional needs (15-30% of nutritional needs) in order to realize a healthy, active, and productive life. Indonesian people are still many who have not used breakfast. Skipping breakfast will have a negative impact on the learning process in school for school children, reduce physical activity, causing obesity in adolescents, adults, and increase the risk of unhealthy snacks. Instead, breakfast supplies the body with the necessary nutrients for thinking, working, and doing physical activity optimally after waking up. Accustomed to breakfast also means getting the wake up discipline and morning activities and prevented from overeating when eating snacks or lunch. Therefore breakfast is one of the important behaviors in realizing balanced nutrition.

b. Low Physical Activity Pattern (Less Sports)

According to respondents, physical activity causes low immunity, causing fatigue and easily enter diseases and disorders of organs. According to respondents, the cause of lazy teenagers physical activity is because tired, lazy, or because there is no time. A number of epidemiological studies have shown that regular physical activity as well as aerobic exercise can improve body metabolism while reducing the risk of Mets and type 2 diabetes mellitus. The latest research recommends that fast walking (fast walking, not casual walking) and other forms of physical activity involving moderate intensity aerobic movements can have the same effect as doing strong aerobic exercise in improving body metabolimets and reducing the risk of heart disease and membranes blood. Although a number of other studies have also found otherwise that stronger physical exercise is more effective in enhancing the body’s metabolimets and preventing Mets and coronary heart disease than performing moderate physical activity.

c. High Template Activity (watch TV, play HP, play games)

According to the respondents, the cause of adolescents have a high sedentary activity pattern is due to refreshing, lazy, upset and exhausted with school activities. Mets also increases with low physical activity and high sedentary activity. Someone is said to have sedentary lifestyle if less physical activity (walking, running, up and down stairs, etc.) or less mobile but more frequent activities settled. This sedentary activity is classified into casual activities such as sitting down, lying down, etc. in everyday both at work and school (working in front of computer, reading, sitting writing, etc.), at home (watching TV, playing games, etc.), on travel / transportation (bus, train, motor), but not including bedtime.

The association of Mets events with sedentary activity has been demonstrated in a number of studies. Pans, et al. 2008 found that Mets was more common in adolescents with lower physical activity (4.3%) than those with moderate (3.1%) and high (2.6%)4. Mark, et al in 2008 suggested that the length of time (screen time) associated with increased risk of Mets in adolescents5. The history of physical activity in childhood is also associated with the risk of Mets in adolescence. This is evidenced by McMurray et al. (2008) who found that
adolescents with Mets were 6.08 times less likely to do aerobic exercise in their childhood and 5.16 times had low levels of physical activity in their childhood. A study found that reducing any type of sedentary activity was associated with a decreased risk of health problems in adolescents aged 5-17 years. All these studies reported that increased sedentary activity was associated with increased risk of Mets and coronary heart disease. Other studies reported that watch time and sedentary activity has long been associated with an increased risk of increased systolic and diastolic blood pressure, HbA1C levels, fasting blood sugar, insulin resistance and Mets.

CONCLUSIONS

This study concludes that the knowledge and behavior of adolescents related to Mets is still very low so it needs to do education related to it to prevent the occurrence of Mets in adolescents. Education can be done using various media or way. One way is to educate through peer educators.

Ethical Clearence: Nil

Source of Funding: Self-funding

Conflict of Interest: Nil

REFERENCES


7. Pacifico et al, 2011


Qualitative Study; Knowledge, ARV Access, and Adherence among People Living with HIV in Bulukumba District, South Sulawesi

Suswani A1, Arsunan AA2, Amiruddin R2, Syafar M3, Yurniati4
1Doctor Program, Faculty of public Health, 2Department of Epidemiology, Faculty of Public Health, 3Department of Health Promotion and Behavior Science, Faculty of Public Health, 4Faculty of Public Health, Hasanuddin University, Makassar

ABSTRACT

Background: HIV/AIDS is a complex problem that requiring active involvement of people living with HIV/AIDS (PLHIV) to control it. Knowledge about ARV access and adherence is essential for PLHIV to improve self-care behavior in seeking health services. This study aim was to obtain a description of knowledge, ARV access, and adherence among PLHIV in Bulukumba District.

Method: Qualitative study was conducted among 10 participant, consisting PLHIV, doctor, counsellor, The National AIDS Commission staff, peer support. Participant was identified by using Snowball sampling with Content analysis.

Result: The results of study provide a description which is most PLHIVs already know the basic information about Human immunodeficiency virus (HIV) Acquired immunodeficiency syndrome (AIDS), prefer to access ARV outside of Bulukumba district, and their reason of not adherence in treatment.

Conclusion: This result suggest to establish a place as a gathering of PLHA for sharing knowledge, mutual support, and reminding each other. Starting antiretroviral (ARV) and adherence are importance to maintain and improve their quality of life.


INTRODUCTION

HIV/AIDS is one of seriously health problems and challenges in the world. Until now, there were 36.9 million PLHIV and 17.1 million were. 22 million of PLHIV did not get access to ARV therapy, including 1.8 million of children.1,2 Mathers and Loncar (2006) predicted the deaths due to HIV/AIDS will continue to increase in 2030.3

Ministry of Health (MoH) reported that HIV prevalence in Indonesia was 191,073 people and AIDS cases were 77,112 people. The number of PLHIV who received ARV therapy is 63,066 people. This means that only about 33% of HIV patients who received ARV therapy.4 South Sulawesi is the second largest of HIV prevalence in eastern Indonesia and Bulukumba district is the third rank of HIV/AIDS prevalence in South Sulawesi.4 The risk factor of HIV transmission are heterosexual, IDU’s, and pregnancy/breast feeding. Bulukumba hospital reported that number of PLHIV who started ARV is only 6.7% of HIV diagnosed.

Knowledge about ARV therapy is importance and dispensable for PLHIV. Lack of knowledge related to ARV therapy can make PLHIVs making wrong decisions about their treatment.4,5 Previous study reveals the quality of life among PLHIV can increase after ARV initiation. Additionally, adherence is also an important component in the success of ARV therapy and improve
their quality of life. However, ARV access is still a polemic in developing countries.\textsuperscript{7,8} This study seeks to provide a description of knowledge, ARV access, and adherence of PLWHA in Bulukumba District.

METHOD

Qualitative study as conducted among 10 participants including PLHIV, doctor, counsellor The National AIDS Commission staff, and chairman of peer support NGO in Bulukumba district. Data were collected by using structured interview instruments in in-depth interview with PLHIV and Focus Group Discussion (FGD) with health officer. Snowball sampling was used to determine the sample. Data was analyzed by content analysis method. The steps on content analysis include: 1) Making a transcript, 2) determine the meaning unit, 3) summarizing and organize data, 4) performing data abstraction, 5) creating categories and theme compilations, 6) drawing a conclusion.

Ethics

This research has obtained Ethical Approval Recommendation Hasanuddin University Number: 547/H4.8.4.5.31/PP36-KOMETIK/2017

FINDINGS

Characteristic of participants

Total of 10 participants, consisting of 6 PLHIV with five male and one female, one of doctor, one of counsellor, one of The National AIDS Commission staff, and chairman of peer support NGO. Interviews with informants were formulated 3 themes, namely knowledge about basic HIV/AIDS information and its treatment, ARV access and adherence to ARV treatment.

Knowledge of HIV/AIDS

PLHIVs knowledge based on interview result as follows:

“HIV/AIDS is deadly disease, most feared by people because it can be transmitted through sex, needles, vertically from HIV-positive pregnant women to their babies and from breast milk. Prevention by not doing risky behavior, always trying to increase knowledge and treated with ARV treatment.”

(PLHIV: SR, 33 years, AB, 27 years)

“HIV is a virus that destroys white blood cells, incurable diseases and having negative stigma in society. It is transmitted through unsafe sex, sharing needles, and from mother to child. HIV can be prevented by not performing risky behavior and can be treated with ARV treatment”

(PLHIV: IK, 33 years)

Our study identified that most of PLHIV understood HIV is a virus which attacks white blood cells, a deadly disease and not healing if it were not treated, transmitted through needles, sex, drugs injection, and mother-to-child transmission. PLHIV considered that HIV is a deadly and feared disease but it can be prevented by increasing information and avoiding risk behavior of HIV transmission. They has known that ARV therapy is a treatment to maintain their quality of life.

ARV access

Interview results with PLHIV related to ARV access, as follows:

“.... Some PLHIV started ARV therapy in Makassar with consideration that safety, comfort, and confidentiality can be more secure compared start treatment in their district. They still do that although they have to spend money for their transportation “

(PLHIV: SR, 33 years)

“...... Actually, we have tried as much as possible to overcome the problem of ARV access at Bulukumba hospital, but PLHIV already started ARV therapy in Makassar did not want to move treatment at Bulukumba hospital. They feel more comfortable undergoing treatment in Makassar “

(Doctor: WW, 44 years)

“...... I often motivate friends to keep taking ARV Therapy even though the place of taking medicine is so far. It’s been one time Bulukumba hospital did not provide ARV regiment. So, there are some of PLHIV who were forced to move treatment in Makassar...... “

(Peer support: DL, 43 years)

Our interview identified that about there were 3 of participants accessing ARV treatment in Makassar (outside of Bulukumba district) and 3 others accessing ARV at Bulukumba hospital. They also said that ARV therapy were not difficult to obtain but transportation cost, consumption, and accommodation every month for who treated in Makassar incriminate participants.
Adherence

Interview results with PLHIV related to treatment adherence as follows:

“… personally, I try to drink ARV therapy on a dose and on time, but sometimes I have to stop taking the medicine when my ARV therapy runs.

(PLHIV: SR, 37 years)

Average of PLHIV adhere on treatment and sometimes they must borrow his friend’s regiment which is same regiment type. They do that because they didn’t have a time to take it at the hospital. But, PLHIV did not drink their ARV regiment when they fell is better and they only multiply exercise to increase their healthy condition.

(Counselor: IB, 45 years)

The behavior of mutual need is always present among PLHIV, for example remind and support each other in medication drinking, especially new PLHA who start ARV therapy. They desperately need information about the benefits, ARV side effects, and how to improve their quality of life.

(Peer support: DL, 43 years)

The interviews results shown that all participants have experience not adherence. Not adherence ARV therapy increases the risk of treatment failure related viral resistance.

CONCLUSION

a. Knowledge of PLHIV

Based on in-depth interviews were conducted among 6 participants shown that most of participants have known basic information about HIV/AIDS. While HIV knowledge will support healthy behaviors because knowledge is a mediator of behavioral change for the individual.

Participants know the transmission mode of HIV/AIDS through needles, sex unsafety, non-sterile blood transfusion, mother to child by blood, semen, and breast milk product. But if mother initiated ARV therapy during pregnancy then risk of mother-to-child HIV transmission by 1%. In our study, HIV prevention are knowledge enhancement and avoid risk behavior. Previous study reported that health education and condom are recommended in the HIV prevention. Additional, study in Africa shown that circumcision accepted as an important strategy for the HIV prevention.

Health education is a long-term behavioral investment. Increasing knowledge of PLHIV can be provided through continuous health education. Its mean, impact of health education can only be seen a few years later. In the short term, health education only produces changes or increases for people’s knowledge. Previous study shown that Adequate knowledge about HIV and ARV therapy will increase adherence and the quality of life.

b. ARV Access

Health care system should be obtainable in every time needed by society that is distributed based on socioeconomic, community and geographical needs. This study shown that most of participants try not to be known by the crowd when they access ARV therapy. Participants who prefer to access treatment outside of district, they hope the hospital can give a sense of safety, comfort and confidential.

Health worker said that number of PLHIV at Bulukumba district is increased but only 6.9% of PLHIV who started ARV at hospital. PLHIV participant confirmed that they started ARV therapy outside of district because sometimes drugs stock at Bulukumba hospital runs out. Predisposing factor for increasing health care access is health care system. PLHIV who is easily to access ARV therapy have twice opportunities to adhere ARV therapy than those who is difficulty to access it.

Additional, PLHIV said that health status are closely related seeking health care service. This study support previous studies which access to health care system is strongly influenced by their condition as unhealthy feelings. It is one of indicator to decide accessing health care services. It is therefore a clear understanding of ARV therapy is needed to increase ARV access.

District health offices (DHO) reported that only 4.3% of PLHIV access ARV therapy at Ujung Bulu sub-district which is Bulukumba hospital established. It shown that goals of fast Track the SDG 2030 program to achieve 90% of people know his HIV status, 90% of people who know his status soon start ARV therapy and 90% who had started ARV therapy showed viral load suppression is still distant. This target can achieve with a strategy.
One strategy developed at Uganda is establish Community ARV Group (CAG). It focus on community-based ARV services which facilitate access to ARV therapy, improve ARV therapy adherence by reduce travel time of patients to the clinic or hospital for drugs taking.29

c. Adherence

The successful of ARV therapy is determined by at least 95% of adherence and viral suppression.27 In our study, all PLHIV participants were identified have experience not adherence. Not adhere were caused by negligence of putting drugs on the medicine box, did not on time take drugs, be embarrassment to the health services, distance factors, hoping drugs from peer support, drug side effects, inappropriate drug dosage, stigma, and cost factors. This result is apprehensive because not adherence was identified increasing the risk of treatment failure and viral resistance.30

Others obstacles of adherence were identified among participants such as cost of transportation, accommodation, administration, and blood checks. Previous study identified that the cost burden caused by HIV disease is greater when having ARV therapy. This suggests that although ARV drugs have been provided free of charge by the government but the financial burden of care remains great. Financial problems indirectly can lead to low adherence of PLWHA in taking ARVs.31

The side effects and size of ARV regiment are also a detention for adherence. Side effects such as nausea, dizziness, and anemia are most frequently appear in the early treatment. But not all PLHIV who initiated ARV therapy experienced side effect of treatment.26 Stigma is also a factor inhibiting treatment, they feel uncomfortable to pick up their drugs at hospital because stigma. Previous study reported that 50% of PLHIV have to skip the time of drinking medicine because they are fear his friends or family knows their HIV status.32

The knowledge about ARV therapy, self-motivation, and support from family friends, peer support, health workers, society, and government also are an important for PLHIV adherence.33-38 All parties obliged to keep the rights of PLWHA in obtaining good and optimal health services, particularly ARV services and maintaining therapy.27

Conclusions

Most of PLWHA already know the definition, transmission, prevention and ARV therapy although all participants ever experienced not adherence. PLHIV who started ARV therapy outside Bulukumba district hope they can more secure, comfortable and confidentiality. Gathering place is recommended for PLWHA which is a place of HIV knowledge sharing, mutual support, and ARV therapy reminder to improve their quality of life.

Conflict of Interest : There is no conflict of interest


REFERENCE

9. Nursalam. Concept and The concept and


Parental Involvement, Academic Performance and Mental Wellbeing of Selected Pre-University Students of Udupi District

Rochelle Jane Dsa¹, Blessy Prabha Valsaran², Renjulal Yesodharan¹

¹Lecturer, ²Former Associate Professor, Department of Psychiatric Nursing, Manipal College of Nursing Manipal, Manipal Academy of Higher Education, Manipal

ABSTRACT

Background: Adolescence is a changing phase of physical and psychological growth and development which occurs during the period from puberty to adulthood. Mental wellbeing is important, if adolescent has good mental wellbeing, it helps in increasing self-esteem and better academic performance. The study was conducted to understand whether parental involvement is important for adolescents in the field of academic performance and mental wellbeing.

Objectives: The objectives were to assess the parental involvement, academic performance and mental wellbeing among the adolescents and to assess the relationship between them.

Method: The design was Survey approach. Total of 380 adolescents were selected using purposive sampling method. The data related to parental involvement was collected based on 32 item Parental Involvement Scale developed by the researchers, academic performance was obtained from mid-term examination and the mental wellbeing was assessed using Warwick Edinburgh Mental Wellbeing Scale.

Results: Among the 380 adolescents, parental involvement was good among 300 (78.9%), adolescents. With regard to academic performance majority 230 (60.5%) obtained first class in their mid-term examination. The mental wellbeing was high among 233 (61.30%) adolescents. Spearman’s rho revealed significant low positive relationship between parental involvement and academic performance rs =0.334, p=0.001, academic performance and mental wellbeing rs =0.103, p=0.045 and parental involvement and mental wellbeing of adolescents rs =0.371, p=0.001.

Conclusion: In support to the literature, this study found that higher the parental involvement, greater is the academic performance and mental wellbeing of adolescents. Parental involvement is very essential.

Keywords: Parental Involvement, Academic Performance, Mental Wellbeing, Adolescents, Midterm examination

INTRODUCTION

Adolescence is a period where children explore their independence and develop a sense of self and free themselves from their parents. The long latency period from 7-12 years repressed their psychosexual development which slowly allowed them to switch to the genital phase. In this phase adolescents are more concerned with peer relationships, hobbies and other interests. Social, communication skills and self-confidence will be developed and they become more focused and self-centered. Those who receive good support and motivation from the parents will develop feelings of self-worth, control and feeling of independence. Those who are not sure of their beliefs and
desires will be insecure and confused about themselves and the future. [1]

As per the National Family Health Survey-3 only 75% of the children in the age group of 6-16 years were attending the schools. About 14 percent of children were not attending the school and 11 percent were dropped out from schools for various reasons. The major reason cited by 36 percent of boys and 21 percent of girls who dropped out of school was “not interested in studies”. Meanwhile, when comparing the overall reasons 38.6 percent was associated with children and 9 percent was associated with school. Parental characteristics such as parental education and occupation also contributed to the discontinuation of schooling of their children. [1] The level of socio economic status and education of the parents are also a key factor for determining the children’s educational achievements. [2]

Parental involvement plays a valuable role in adolescent’s life [3] for their overall development and helps the child to lead a good and successful life. It is also considered as a strong predictor of academic achievement. Studies have shown that when parents are interested in their children’s academic activities such as homework the adolescents study better. [4]

Parental involvement helps the students to achieve the abilities underlying the emotional intelligence for monitoring one’s own and other’s feelings and emotions, to discriminate among them, and to use this to guide one’s thinking and actions. [5] Studies have also showed that emotional intelligence has positively influenced the academic performance. [6]

The busy working schedules of the parents make them unavailable to their children leads to substantial reduction in the mental wellbeing and the ability to solve problems which in turn reduces the academic performance and makes them engage in high risk activities. Recently reports were circulating in media of vulnerable people being encouraged to take their own lives by a series of challenges. [7] In India, the death of some adolescent students were linked to the ‘Blue Whale challenge’

Adolescents having mental health problems are the predictors for future mental distress. After eighteen months of graduation, few adolescents suffered from depression, anxiety and low self-esteem which were correlated with many perceived problems leading to low mental wellbeing. [8] Older children reported lower levels of parental involvement and higher levels of poor mental health as compared to younger students. Girls reported more symptoms of poor mental health like loneliness, anxiety and depression in cases where parental involvement was low. [9] In this background, the study was conducted to find out the relationship between parental involvement, academic performance and mental wellbeing of selected Pre University students of Udupi district.

MATERIALS AND METHOD

Study design
A descriptive epidemiological study was conducted among 380 first year Pre-University adolescents studying in various Pre University Colleges of Udupi district. The samples were selected using purposive sampling technique. The adolescents selected were day scholars studying in first year Pre University colleges and who had taken science and commerce stream. After obtaining the administrative permission and formal permission from the principals of colleges, and after obtaining the consent from the research participants, the study was conducted. The purpose of the study was explained to the participants and the participants were selected on a voluntary basis.

Study setting
The study was conducted in different colleges of Karkala block in Udupi district. Among the twenty five Pre University Colleges of Karkala block, four colleges were selected by simple random sampling method using lottery method. The colleges selected were Government Pre University College Hebri, NITTE Pre University College Karkala, Christ King Pre University College Karkala and Government Pre University College Sanoor. Both government and private colleges of urban and rural areas were selected.

Study duration
The study was conducted in between August 2015-July 2016.

Sample size
The Sample size calculation was based on previous study proportion of parental involvement. Previous study proportion of parental involvement was 45%. [9]
The sample size was calculated to be 380 using the following statistical formula:

\[
\text{Estimation of proportion: } n = \frac{Z^2 [1-\alpha/2] P (1-P)}{d^2}
\]

Where \(Z^2 (1-\alpha/2) = 1.96^2\) (constant value), \(P = \text{Expected proportion (45\%)}\), \(d = \text{Absolute error (5\% error)}\).

Description of the tool

Tools used for the study were demographic proforma and Parental Involvement Scale. These tools were developed by the researchers. The demographic proforma consists of 18 items. Parental Involvement Scale is a scale containing 32 items. It is a five-point scale having specific areas like academic involvement, psychological involvement, spiritual involvement and social involvement. The tool was prepared by the researchers since culturally applicable tool for assessing parental involvement was not available. The tool was validated by thirteen experts and the reliability of the tool in English was assessed using Cronbach alpha method and was 0.77. The tool was translated in Kannada and the reliability of the tool was 0.81. Scores of Parental Involvement were arbitrarily classified into three categories like poor parental involvement (32-97), moderate parental involvement (98-127) and good parental involvement (128-160). The maximum score of the tool was 160 and the minimum score was 32. The tool was translated to kannada because the medium of education for some colleges till their SSLC was kannada.

The academic performance of first year Pre University students was assessed using the mid-term examination marks. The marks were categorized into four categories that is distinction (greater than 85\%), first class (60-84\%), second class (35-59\%) and fail (less than 35\%).

The mental wellbeing of adolescents was assessed using Warwick Edinburgh Mental Wellbeing Scale (5 point scale) which consisted of 14 items with pre-established reliability of 0.89. Each item had 5 alternatives: ‘none of the time’, ‘rarely’, ‘some of the time’, ‘often’ and ‘all of the time’ with the scoring of 1,2,3,4 and 5 respectively. The tool was translated in Kannada and the reliability of the tool was 0.77. The permission for use of this tool was given by the author. Scores of mental wellbeing were arbitrarily classified into three categories less than 30 as low mental wellbeing, 31-50 moderate mental wellbeing and greater than 50 as high mental wellbeing.

Ethical Clearance: Approval for the study was obtained from the Institutional Ethics Committee from Kasturba Hospital, Manipal. (IEC 682/2015).

Statistical analysis: Chi-square test was done to see the association between the variables and Spearman’s rank correlation coefficient was used to see the monotonic relationship between the variables. SPSS software version 20.0 was used for calculation.

RESULTS

Demographic proforma showed that among the 380 adolescents, most of them were 16 years of age, 223 (58.7\%) and were females 203 (53.4\%). Majority belonged to Hindu religion 241 (63.4\%) and the many of adolescents belonged to science section 201 (52.9\%). Two hundred and fifty six (65.8\%) of the adolescents were living in a nuclear family and most of them were living in rural areas 226 (59.5\%). Among half of the participants the parental involvement was found equal between both the parents 190 (50\%). The time spent by majority of the adolescents to pray along with their parents was between 15 to 30 minutes 195 (51.3\%)

Majority of the adolescents 300 (78.9\%) had good parental involvement, 72 (18.9\%) of the adolescents had moderate parental involvement, and 8 (2.1\%) had poor parental involvement in life.

The academic performance of the adolescents, majority 60.5\% (230) belonged to first class category. 27.4\% (104) belonged to second class, 9.7\% (26) had distinction and 8.42\% (9) belonged to failed category in their mid-term examination

Among the adolescents, majority of them 233 (61\%) had high mental wellbeing, 134 (35\%) adolescents had moderate mental wellbeing and a very few 13 (4\%) had low mental wellbeing.

The relationship between parental involvement and academic performance was assessed using Spearman’s rho correlation coefficient and there was significant low positive correlation between parental involvement and academic performance \(r_s = .334\). There was little correlation between academic performance and mental wellbeing \(r_s = .103\). There was low positive correlation between parental involvement and mental wellbeing of
adolescents ($r_s = .371$)

Table 1: Association between mental wellbeing and age of the student, type of family, residential area and economic status

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Mental Wellbeing</th>
<th>Percentage (%)</th>
<th>Value, ($\chi^2$ &amp; ‘p’ value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (n)</td>
<td>Moderate (n)</td>
<td>High (n)</td>
</tr>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>16</td>
<td>5</td>
<td>86</td>
<td>132</td>
</tr>
<tr>
<td>17</td>
<td>8</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>18</td>
<td>0</td>
<td>04</td>
<td>13</td>
</tr>
<tr>
<td>Number of Siblings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only Child</td>
<td>5</td>
<td>17</td>
<td>32</td>
</tr>
<tr>
<td>One</td>
<td>1</td>
<td>53</td>
<td>95</td>
</tr>
<tr>
<td>Two</td>
<td>7</td>
<td>50</td>
<td>81</td>
</tr>
<tr>
<td>More than two</td>
<td>0</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>Attending Tuition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>36</td>
<td>68</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>98</td>
<td>165</td>
</tr>
<tr>
<td>Type of family</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td>7</td>
<td>108</td>
<td>135</td>
</tr>
<tr>
<td>Joint</td>
<td>4</td>
<td>18</td>
<td>57</td>
</tr>
<tr>
<td>Extended</td>
<td>2</td>
<td>8</td>
<td>41</td>
</tr>
<tr>
<td>Residential area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>7</td>
<td>98</td>
<td>121</td>
</tr>
<tr>
<td>Urban</td>
<td>2</td>
<td>8</td>
<td>57</td>
</tr>
<tr>
<td>Semi-Urban</td>
<td>4</td>
<td>28</td>
<td>55</td>
</tr>
<tr>
<td>Economic Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 5000</td>
<td>2</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>5001-10000</td>
<td>6</td>
<td>42</td>
<td>61</td>
</tr>
<tr>
<td>10001-20000</td>
<td>2</td>
<td>46</td>
<td>63</td>
</tr>
<tr>
<td>20001-30000</td>
<td>2</td>
<td>17</td>
<td>51</td>
</tr>
<tr>
<td>30001 and above</td>
<td>1</td>
<td>15</td>
<td>40</td>
</tr>
</tbody>
</table>

* $p<.05$, Statistical Significance

Mental wellbeing was significantly associated with number of siblings ($\chi^2 = 10.69$, $p<.045$), attending tuitions ($\chi^2 = 6.29$, $p<.046$), type of family ($\chi^2 = 22.26$, $p<.001$), residential area ($\chi^2 = 25.87$, $p<.001$) and economic status ($\chi^2 = 12.43$, $p<.004$) and is shown in table 1.
DISCUSSION

The present study showed that majority of the adolescents 300 (78.9%) had good parental involvement, 72 (18.9%) of the adolescents had moderate parental involvement, and 8 (2.1%) had poor parental involvement in life. There was low positive correlation between parental involvement and academic performance \( r = .33, \ p < .001 \). The findings of the study are in par with the results of another study that assessed the extent of parental involvement in their children’s academic achievement. The results were (64.7%) parents of the respondents had high level of involvement in their children’s academic activities, whereas (23.3%) parents of the respondents had medium level of parental involvement in their children’s academic activities and remaining (12%) parents of the respondents had low level of parental involvement in their children’s academic activities.\(^{[10]}\) This finding of the study supports the results of another study which was conducted in Chennai to assess the parental involvement in relation with academic achievement. The results showed that there was low positive relationship between the parental involvement and academic achievement of children \( r = .312, \ p < .001 \).\(^{[11]}\) A study conducted in Iran also yield a similar relationship \( (r = .3261), p < .001 \) between parental involvement and academic performance.\(^{[6]}\) A recent review also found that parental involvement, whether at home or at school, have a positive relationship with students’ academic performance. Parental involvement in home activities, participation in school events, monitoring and communication with children, parenting style and educational expectations were the important constructs considered by the reviewers.\(^{[12]}\) The present study also considered these constructs for measuring the parental involvement. There is an inconsistency exist in the reporting of results of relationship between parental involvement and academic performance. Few studies also contradict the findings of this study making it difficult to generalize the positive relationship between them. These differences in the results are may be due to the differences in culture, age group of the students, educational policies and practices etc. A meta-analysis from 25 studies also showed a positive between parental involvement and students’ academic achievement shows \( r = .33, \ p < .001 \).\(^{[13]}\)

The present study showed that there was correlation between academic performance and mental wellbeing \( r = .103, \ p < .001 \). This supports the study by Singh, 2015 that was conducted in Ranchi India to assess the mental health and academic achievement of college students. Results showed that there was low positive relationship between mental health and academic achievement \( r = .4251, \ p = .001 \).\(^{[14]}\) This study also supports a systematic review was conducted between academic achievement and psychological wellbeing which showed a positive relationship correlation between wellbeing and academic achievement.\(^{[15]}\)

Limitations: The study was confined only to adolescents studying in science and commerce section of First year Pre University College; data were collected from the adolescents, without involvement of the parents; and purposive sampling technique was used.

CONCLUSION

As the parental involvement increases, greater is the academic performance and mental wellbeing of adolescents. Hence the parental involvement plays an important role in developing positive mental wellbeing in their children and in improving the academic performance of the adolescents

Ethical Clearance- Taken from Institutional Ethics Committee of Kasturba Hospital, Manipal. (IEC 682/2015).

Source of Funding- Self

Conflict of Interest – Authors declare no conflict of interest

REFERENCES


15. Gräbel BF. The relationship between well-being and academic achievement: a systematic review [Masters thesis]. Department of Behavioral, Management & Social Sciences, University of Twente; 2017.
Triple Band Monopole Frequency Reconfigurable Antenna for Wireless Medical Applications

G Jyothsna Devi¹, U Ramya¹, B T P Madhav²

¹ Scholar; ²Professor, ALRC, Department of ECE, Koneru Lakshmaiah Education Foundation, Vaddeswaram, AP, India

ABSTRACT

Objective: A compact monopole antenna with frequency reconfiguration is presented in this paper. Analysis: The antenna is fed with microstrip line feeding. The antenna dimension is 37x25.5x0.8mm³ and is fabricated on FR4 epoxy substrate. The proposed antenna is a triple band antenna; it covers LTE, Wimax and WLAN applications. Method: The antenna attains frequency reconfiguration and the aerial is made to be reconfigurable using PIN diodes. The proposed structure is simulated by using HFSS software. Findings: The antenna is operated in 3 bands when 2 diodes D₁, D₂ are OFF & ON with centre frequencies 2.29GHz, 3.29GHz, 5.19GHz. Efficiency attained by the antenna is 96.3% and gain achieved is 4.7dB. Results: The proposed antenna exhibits good performance and it is well suitable for wireless medical and other communication applications.

Keywords— Compact, monopole antenna, frequency reconfiguration, PIN diodes

INTRODUCTION

Due to this increase in modern communication there is an insufficiency in spectral bandwidth and this became a very serious issue¹. To overcome this, advanced systems for wireless communications and new technologies are developed to utilize the spectrum very efficiently. One of the vital technologies is reconfigurability². There are various benefits for antennas possessing reconfiguration such as mitigation of interference³.

In⁴, switchable aerial with three switchable frequencies is proposed. In⁵, a double band frequency switchable antenna is proposed and in⁶, a triple band frequency switchable antenna is proposed. In⁷, bandwidth switchable antenna is proposed. To make antenna to be reconfigurable, switches are used. Without placing extra structures in the design switches are used. Switches like RF MEMS⁸ are used for reconfiguration. Diodes are also used to make antenna to be switchable. Diodes like p-i-n diodes⁸, varactor diodes¹⁰ are used to obtain reconfiguration. FETs can also make antenna to be reconfigurable¹¹. By controlling the states of diodes frequency switching can be achieved¹². To achieve frequency reconfiguration, PIN and RF MEMS are mainly used. Among these two PIN diodes are widely used due to its simple construction. These diodes are placed at any place in the antenna structure such as they can be placed in patch or in ground or in both places and the placement of switch depend on the switch type¹³-¹⁸.

These switches are usually controlled by DC signals. To support different frequencies the antenna will be switchable by altering the states of switches that is the switch is made to be on and off to achieve reconfiguration¹⁹-²⁴. Varactor diodes are essential to make the antenna to be switchable in frequency continuously otherwise PIN diodes are enough to make the aerial to be switchable. Various operating modes can also be achieved using single antenna. Good impedance matching, good gain and efficiency can be achieved by using these antennas²⁵-³⁰.

In this paper, we proposed a frequency reconfigurable antenna which consists of a fractal shape radiator and the radiator consists of two PIN diodes. By using this switching mechanism, we achieve triple band applications. This design grant to operate at 3 bands centered at 2.29 GHz, 3.30 GHz and 5.19 GHz covering LTE, Wi-Fi and WLAN applications.
Antenna DESIGN

Fig. 1 depicts the geometry of proposed antenna. The structure of the proposed design comprises of ground plane which is defected and is in the shape of arc, radiator is of fractal shape comprising of 4 semicircular rings and 2 PIN diodes are used to make the antenna ON and OFF. The antenna which is shown in Fig. 1 is constructed on FR4 epoxy dielectric material named as substrate possessing loss tangent of 0.02 and possessing dielectric constant of 4.4.

The overall dimension of the structure proposed is 37x27.5x0.8mm. The outer 4 semicircular rings radius are R1=6.5mm, R2=5.5mm. The middle 4 semicircular rings radius are R3=5.3mm, R4=4.3mm. The inner 4 semicircular rings radius are R5=4mm, R6=3mm and ground arc shape radius are R7=8mm, R8=2.2mm.

Fig. 2 describes various structures or iterations of the proposed antenna. The antenna is excited by micro strip line feeding of feed length L\text{f}=12mm, and feed width W\text{f}=2.5mm for good impedance matching.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Dimension (mm)</th>
<th>Parameter</th>
<th>Dimension (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W\text{sub}</td>
<td>25.5</td>
<td>R1</td>
<td>6.5</td>
</tr>
<tr>
<td>W\text{f}</td>
<td>2.5</td>
<td>R2</td>
<td>5.5</td>
</tr>
<tr>
<td>W\text{g}</td>
<td>7.19</td>
<td>R3</td>
<td>4.3</td>
</tr>
<tr>
<td>L\text{sub}</td>
<td>37.0</td>
<td>R4</td>
<td>4.0</td>
</tr>
<tr>
<td>L\text{f}</td>
<td>12.0</td>
<td>R5</td>
<td>3.0</td>
</tr>
<tr>
<td>L\text{g}</td>
<td>6.5</td>
<td>R6</td>
<td>2.2</td>
</tr>
<tr>
<td>L\text{g1}</td>
<td>3.0</td>
<td>------</td>
<td>------</td>
</tr>
</tbody>
</table>

Fig. 2(d) illustrates the positions of diodes. 2 PIN diodes are placed in between the outer and middle semicircular shape and in between the middle and the inner one. Based on the feed line dimensions there will be good impedance matching. This leads to good coverage. As there are advantages in monopole antenna like Omni directional patterns, good performance and high efficiency, monopole structure is designed. Table 1 illustrates the dimensions of the designed antenna.

Pin diodes are used to make the antenna to be reconfigurable. Here 2 PIN diodes D1, D2 are used to make the aerial to be switchable. The PIN diodes are placed on the radiator and PIN diodes are named as BAR 63-03W possessing resistance of 1.5kΩ and inductance of 0.45nH in OFF condition and resistance of 0.7Ω and inductance of 0.45nH in ON condition. There is a shift in frequency by changing the states of the two PIN diodes. As well as by altering the capacitor values there is a shift in frequency. So, the capacitance is one which also influences the frequency shift. The proposed aerial is designed and simulated using HFSS software. The antenna covers 3 bands: 2.21-2.45GHz, 3.14-3.53GHz, and 4.87-5.54GHz centered at 2.29GHz, 3.29GHz and 5.19GHz.
3.53GHz and 4.87-5.54GHz for LTE, Wi-Fi and WLAN applications.

RESULTS AND DISCUSSION

The proposed antenna is simulated using HFSS software. The frequency response for various iterations shown in Fig. 2 is depicted in Fig. 3.

Fig. 3. Various Iterations Return loss.

Fig. 4 depicts the frequency response based on the states of 2 PIN diodes. When both the diodes D1, D2 are OFF then the antenna covers 2.22-2.45GHz with centre frequency of 2.40GHz and 3.85-5.56GHz with centre frequency of 4.0GHz. When D1, D2 are ON OFF then it covers 2.42-2.90GHz with centre frequency of 2.69GHz and 4.19-6.11GHz with centre frequency of 4.28GHz. When D1, D2 are OFF ON, it covers 2.21-2.47GHz with centre frequency of 2.29GHz, 3.14-3.53 with centre frequency 3.29GHz and 4.92-5.53GHz with centre frequency 5.19GHz. When both diodes D1, D2 are ON then it covers 2.49-3.0GHz with centre frequency 2.67GHz and 4.98-5.87GHz with centre frequency 5.18GHz.

Table 2 depicts the frequency bands and their centre frequency of proposed antenna for different conditions of diodes. The two PIN diodes operating state and coverage along with central frequency can put on show in the table.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Diode conditions</th>
<th>Bandwidth</th>
<th>Centre frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D1 OFF, D2 OFF</td>
<td>2.22-2.45GHz, 3.85-5.56GHz</td>
<td>2.40GHz, 4.0GHz</td>
</tr>
<tr>
<td>2</td>
<td>D1 OF, D2 ON</td>
<td>2.42-2.90GHz, 4.19-6.11GHz</td>
<td>2.69GHz, 4.28GHz</td>
</tr>
<tr>
<td>3</td>
<td>D1 ON, D2 OFF</td>
<td>2.21-2.47GHz, 3.14-3.53GHz</td>
<td>2.29GHz, 3.29GHz</td>
</tr>
<tr>
<td>4</td>
<td>D1 ON, D2 ON</td>
<td>2.49-3.0GHz, 4.98-5.87GHz</td>
<td>2.67GHz, 5.18GHz</td>
</tr>
</tbody>
</table>

The radiations patterns when diodes D1, D2 are in OFF and D1, D2 are in OFF ON are illustrated in Fig. 6. The pattern configuration in the form of omni directional pattern. It practical in H plane and bidirectional pattern is experiential in E plane for both conditions.

Fig. 5(a). Radiation patterns (c) D1 OFF, D2 OFF (d) D1 OFF, and D2 ON.

Fig. 5(b). Radiation patterns (a) D1 ON, D2 OFF (b) D1 ON, and D2 ON.

The radiations patterns when diodes D1, D2 are ON OFF and D1, D2 are ON ON are exhibit in Fig. 5. Omni directional pattern is observed in H plane and bidirectional pattern is observed in E plane for both conditions. In every condition the pattern shift can be constant.

The current distribution when diodes D1, D2 are OFF OFF and D1, D2 is OFF ON is illustrated in Fig. 6. The current is uniformly distributing over the entire
The efficiency for various diode conditions is shown in Fig. 7(b). When D1 is OFF and D2 is ON the utmost radiation efficiency obtained is 96.3%. When D1 is ON and D2 is OFF then the most antenna efficiency obtained is 95.8 and when both the diodes D1 is OFF and D2 is OFF then the maximum efficiency obtained is 92.96%. The proposed antenna entirely covers up to maximum efficiency.

Fig. 7(b). Efficiency for various diode states.

Table 3 gives the comparison between the proposed antennas with previously published papers. The size of designed antenna with efficiency should be compare with previous work is display in Table3.

<table>
<thead>
<tr>
<th>Refe no.</th>
<th>Antenna size in mm</th>
<th>No of diodes</th>
<th>Efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[2]</td>
<td>45x116mm³</td>
<td>1</td>
<td>85</td>
</tr>
<tr>
<td>[3]</td>
<td>70x30x0.8mm³</td>
<td>2</td>
<td>93</td>
</tr>
<tr>
<td>[5]</td>
<td>40x35x0.8mm³</td>
<td>2</td>
<td>83</td>
</tr>
<tr>
<td>[9]</td>
<td>32x35x1.6mm³</td>
<td>6</td>
<td>92</td>
</tr>
<tr>
<td>[10]</td>
<td>87x102x0.8mm³</td>
<td>3</td>
<td>94</td>
</tr>
<tr>
<td>Proposed antenna</td>
<td>37x25.5x0.8mm³</td>
<td>3</td>
<td>96.3</td>
</tr>
</tbody>
</table>

**Table 3: Comparison of proposed antenna with previous published papers.**

**CONCLUSION**

A monopole antenna with frequency reconfiguration is presented which covers LTE, Wimax and WLAN bands. The design structure exhibits good efficiency, Omni directional patterns and is of low profile. Frequency reconfiguration is achieved using 2 PIN diodes. By changing the states of 2 PIN diodes, there is a shift in frequency. As well as by changing the capacitor values, there exists a shift in frequency. By controlling the states of diodes, the current path can be altered which
in turn alters the frequency. When both the diodes D1, D2 are OFF then the antenna covers 2.22-2.45 GHz with center frequency of 2.40 GHz and 3.85-5.56 GHz with center frequency of 4.0 GHz. When D1, D2 are ON then it covers 2.42-2.90 GHz with center frequency of 2.69 GHz and 4.19-6.11 GHz with center frequency of 4.28 GHz. When D1, D2 are OFF then it covers 2.21-2.47 GHz with center frequency of 2.29 GHz, 3.14-3.53 GHz with center frequency of 3.29 GHz and 4.92-5.53 GHz with center frequency of 5.18 GHz. This antenna is a best choice for multi frequency applications.

Ethical Clearance- Taken from ALRC of ECE, KLU

Source of Funding: This work is supported by ECR/2016/000569, EEQ /2016/000604

No Conflict of Interest

REFERENCES


Fractal Shaped Concentric Ring Structured Reconfigurable Monopole antenna with DGS for GPS, GSM, WLAN and ISM Band Medical Applications

M Monika¹, Sk Rajiya¹, B T P Madhav²

¹Scholars, ²Professor, ALRC, Department of ECE, Koneru Lakshmaiah Education Foundation, AP, India

ABSTRACT

Objective: To fulfil the wireless and ISM band medical communication applications, a design of frequency reconfigurable circular patch antenna is presented in this paper. Analysis: Three circular rings and small circle are implanted inside the patch with overall dimensions of 50mmx50mm to realize triple band operation. Method: Finite element method based Ansys HFSS is used to design and simulate the model. Findings: The designed antenna is suitable for PCS, WLAN and X-band applications. Therefore, it covers L-band (1.85-2.1GHz) for PCS, WLAN (5.8-6.7GHz) and X-band (10.3-11.6GHz) for satellite and space research applications. Result: Reconfigurability, in frequency bands are obtained by placing four PIN diodes inside the circular patch. The constructed antenna shows reliable radiation patterns, good impedance characteristics.

Keywords – PCS (personal communication services), WLAN (wireless local area network) RA (reconfigurable antenna).

INTRODUCTION

In 1983 the concept of reconfiguration is introduced in a U.S patent¹. The reconfiguration techniques have fascinated many scientist’s consideration due to their multi-functional characteristics². Many of the wireless communication systems need antennas which operate at more than one frequency by maintaining a small size³. Reconfigurable antennas have achieved symbolic attention in communication, navigation and in surveillance by accommodating their functionalities to attain judgement in frequency, polarization, pattern along with gain and bandwidth⁴. In⁵ frequency reconfigurable antenna is reported. A fractal dipole antenna by utilizing PIN diodes are examined in⁶. T-shaped monopole antenna⁷. For satellite navigation both frequency and polarization are referred in⁸. To minimize the system size, cost of the material and to avert electromagnetic interference these reconfigurable antennas are ordinarily favoured. An annular slot antenna is reported in⁹, printed dipole antenna¹⁰. A frequency tunable micro strip antenna is presented in¹¹, with polarization and frequency diversity a micro strip antenna in¹². Many wireless devices like GPS, GSM, WLAN and Bluetooth can be regulated by a single wireless device. Reconfigurable antennas are required to comprise these devices low profile and more functional. Frequency reconfiguration has fascinated consideration and cognitive radio is the best example of frequency reconfigurable antennas¹³. By governing the effective length of dimensions of the antenna frequency reconfiguration is attained. To operate in multiple frequency bands their operation can be reconfigured. Depending upon the user’s demand the frequency operation can be altered¹⁴. For frequency shifting or switching, these days electrical switches like PIN diodes, RF MEMS and varactor diodes are ordinarily used¹⁵-20.

In this paper, a circular patch reconfigurable antenna is used, and triple band is attained. The final designed antenna covers the frequency range of 1.7-2.1GHz, 5.8-6.6GHz and 10.2-11.3GHz of PCS, WLAN and X-band applications. PIN diodes are used to attain frequency switching because it needs less driving voltage. It is reliable, easy to fabricate low cost.

Corresponding author :
B T P Madhav
E-mail: btpmadhav@kluniversity.in
ANTENNA DESIGN

The proposed reconfigurable antenna is ingrained on FR-4 substrate with relative permittivity of 4.4. In order to reduce the weight of the equipment, the size of the antenna should be small for modern wireless communication systems. The overall dimension of the designed antenna is 50mmx50mm.

The proposed antenna has partial ground with length of $a=15$mm in order to improve the gain with a rectangular slot in the ground. To feed the antenna a micro strip line with 3mm width to contribute 50Ω input impedance. Three rectangular slots are interpolated in the feed line. Fig 1(a) shows the designed antenna with outer circle radius of $R=14$mm and the width of the ring is 1mm and also four inner rings with the radius of 5.7mm and a width of 0.6mm. Fig 1(b) represents antenna with another four circular rings of radius 5mm and a width of 0.6mm. Fig 1(c) displays the designed antenna with other smaller rings of radius with radius of 4mm and a width of 0.4mm. Small circles which are inserted inside the three circular rings are shown in Fig1(d). Fig 1(e) represents the final proposed antenna model. Here, four PIN diodes are ingrained in the circular rings in order to achieve frequency switching. Frequency shifting is attained by placing four PIN diodes in four circular rings. In the centre of the patch, a circular slot is infused to improve the frequency coverage. $L=50$, $W=50$, $R=14$, $a=15$, $b=22.3$, $c=17.1$, $d=3$, $e=13$, $f=2.2$, $g=1$, $r=2$, $x=5.7$, $y=5$, $z=4$.

RESULTS AND DISCUSSION

By using HFSS software the proposed antenna is examined and illustrated. For the designed structure triple band is attained. In terms of return loss, VSWR, radiation pattern, surface current and electric current distribution, gain and input impedance the analysis of antenna is observed. After placing switches frequency switching is obtained and here, four antenna models are inspected. Fig 2(a) shows the return loss curves of the designed antenna four models. The antenna model 1 with first ring inside the outer circle it covers the frequency range from 1.67-2.06GHz, 5.16-6.17GHz, 9.3-10.27GHz and 11.21-11.84GHz with minimum return loss. By inserting the second ring the antenna model 2 covers the frequency range from 1.84-2.1GHz, 5.19-6.6GHz, and 11.8-12.3GHz. The frequency coverage from 1.82-2.17GHz and 4.5-6.8GHz by adding third ring dual band is realized. The final proposed antenna model with small circle shows triple band with frequency coverage from 1.79-2.14GHz, 5.47-6.5GHz and 9.9-12.08GHz with good return loss.

By placing four PIN diodes in the designed antenna frequency shifting takes place. When all four switches are in ON condition the antenna covers the L-band frequency from 1.85-2.17GHz with return loss of -21.6dB for personal communication service applications, 5.8-6.7GHz with maximum return loss of -34.2dB for WLAN application and X-band frequency from 10.3-11.6GHz with return loss of -15.2dB for satellite and space research applications.

To design the switches the length of switch s1 and s3 is 0.3mm and the width is 1mm. The length of switch s2 and s4 is 0.5mm and width is 0.5mm. ‘1’ represents that the switch is in ON condition and ‘0’ represents that the switch is in OFF condition.

When switch s2, s3, and s4 are in OFF condition and s1 is in ON condition the antenna covers the frequency range from 1.84-2.18GHz with return loss -19.33dB, 5.6-6.7GHz with maximum return loss of -34.7dB and 10.3-11.8GHz with return loss of -18.5dB.
In case of s1, s2 and s4 are in OFF condition and s2 ON the designed antenna covers the frequency range from 1.8-2.16GHz with return loss -17.9dB, 5.73-6.6GHz with maximum return loss of -32.01dB and 10.2-11.79GHz with return loss of -16.6dB.

When s2, s3 ON and s1, s4 are in OFF condition the antenna covers the frequency from 1.6-2GHz with return loss -12.9dB, 5.7-6.6GHz with maximum return loss of -26.4dB and 10.5-11.6GHz with return loss of -14.8dB.

The energy radiated by the antenna is shown by radiation pattern. By utilizing circular patch antenna either circular or linear polarization can be diffused. In both E-plane and H-plane the radiation characteristics are conspired in following figure. Fig 3 represents the radiation pattern before placing the switches in the design.

![Co-polarization](image)

**Fig. 3. Radiation pattern in E and H-plane**

The gain of the suggested antenna represents how much power is forwarded in the peak radiation direction. Gain of the designed antenna with switches and without switches is show in fig 4.

![Gain of the suggested antenna without switches and with switches](image)

**Fig. 4 Gain of the suggested antenna without switches and with switches**

The electric field distributions with switches and without switches are shown in figure 5. The distributions of current are examined with switches and without switches and recognize that the ultimate current is dispersed along the feed factor and circular patch. After placing switches, the distribution of current is highly substantial.

![Electric field distribution](image)

**Fig. 5 Electric field distribution of the constructed frequency reconfigurable antenna without switches and with switches**

By varying the radius of the outer circle ‘R’ parametric analysis from 13.8mm to 14.2mm of the designed antenna is accomplished. By decreasing the radius from actual radius 14mm to 13.8mm the resonant frequency values attained around 1.97, 6, and 10.7GHz with maximum return loss of -42.7dB. At 13.9mm the resonant frequency values obtained around 1.94, 5.9 and 10.8GHz with maximum return loss of -31.79dB. By increasing the radius to 14.1mm the resonant frequency values attained around 1.99, 5.98 and 10.9GHz with maximum return loss of -29.1dB. At 14.2mm radius the resonant frequency values attained around 1.96, 5.98 and 10.9GHz with maximum return loss around -31.9dB.

By changing the radius of small circle ‘r’ inside the patch parametric analysis of the antenna is performed. By minimizing the radius from actual radius 2mm to 1.8mm the resonant frequency values attained around 1.95, 6.08 and 10.77GHz with maximum return loss of -34.04dB. At 1.9mm the resonant frequency values obtained at 1.9, 5.98 and 10.88GHz with maximum return loss around -34.1dB. When the radius of the circle increases to 2.1mm, the resonant frequency values achieved at 2.08, 5.9 and 10.75GHz with maximum return loss around -23dB. At 2.2mm radius the resonant frequency values obtained around 1.98, 5.97 and 10.9GHz with maximum return loss of -20.1dB. The parametric analysis of small circle radius inside the patch ‘r’ is shown in the Figure 6.
CONCLUSION

A frequency reconfigurable antenna for wireless and medical communication applications has been studied and suggested in this paper. The circular rings are placed inside the patch to obtain triple band operations at PCS, WLAN and X-band applications with centre frequency of 1.9/5.9/10.8GHz. Frequency switching is obtained by positioning four PIN diodes inside the radiator. The suggested antenna exhibits good return loss (S11<-10dB) and satisfies VSWR criteria (VSWR<2) at operating bands. The designed antenna shows good impedance, radiation characteristics with adequate gain.

Source of Funding: Funded by ECR/2016/000569, EEQ /2016/000604

Ethical Clearance: Taken from the department chair of KLEF and DDC members to publish this work. No Conflict of Interest.

REFERENCES


Triple Band Defected Ground Structure F-Shaped Monopole Antenna for Medical Band Applications

Raghava Yathiraju¹², P Pardhasaradhi³, B T P Madhav³

¹Research Scholar; Department of ECE, Koneru Lakshmaiah Education Foundation, AP, India, ²Assistant Professor; Dept of ECE, St. Mary’s Group of Institutions, Guntur, ³Professor; ALRC-R&D, Department of ECE, Koneru Lakshmaiah Education Foundation, AP, India

ABSTRACT

Objective: The DGS is one of the key important structures to gain multiband characteristics from MSP antennas. In this work, F-shaped monopole with DGS are placed to enhance the performance of the antenna bandwidth including dual band, triple band and multiband characteristics and to reduce the harmonics.

Analysis: The modelled DGS monopole antenna is working at multiband and showing size reduction to get LC resonant properties in the medical band.

Method: By placing DGS in the proposed antenna base, additional operating frequencies are gained due to the unequal change in the current distribution path of the antenna.

Findings: The modelled antenna is fabricated on FR 4 substrate material and measured results are noted from Anritsu combinational analyzer (vector network analyzer + spectrum analyzer).

Result: The simulation results from HFSS are in good matching with measured results from fabricated antenna model.

Keywords: Triple Band, Defected Ground, F-Shaped, Monopole Antenna

INTRODUCTION

There is a never-ending demand for compact and multiband antennas in the communication systems. The communication systems became smaller due to greater integration of electronic devices and antenna became a significant larger part of the overall volume¹⁴. In some of the cases, low profile antennas and their designs are very important for fixed wireless communication applications. The microstrip antenna is having numerous applications and advantages over other types of antennas⁵⁻⁸. There is a never-ending demand for these antennas because of low profile, printed technology and integration with MMIC and RFIC devices. The performance of the antenna mostly depends upon the substrate material that is used in the design of the antenna⁹⁻¹². Choosing a proper substrate material with relevant structure will improve the performance characteristics of these antennas. The microstrip antenna also suffers with narrow bandwidth and low efficiency. To overcome these problems, we must choose a proper structure with some performance improvement techniques like DGS, FSS and metamaterial like things must be incorporated in the design¹³⁻¹⁸.

Defected ground structures and defected microstrip structures are widely used techniques to enhance the radiation characteristics and bandwidth of the advanced antennas. The defected microstrip structure can be easily integrated with other microwave circuits and effectively reduce the circuit size¹⁹⁻²⁰. The DMS exhibits some properties like slow wave, rejecting microwaves at certain frequencies and change in electrical length in certain circuits which are like DGS. DMS is generally used to enhance the behavior of passive circuits and perform LC resonance property in certain frequency and suppress the unwanted signals. This DMS will increase the electrical length of the antenna and disturb the current distribution thereby reducing the resonant frequency operating band from higher frequency to lower frequency²¹⁻²³.
RESULTS AND DISCUSSION

Fig 2.1 shows the return loss curve for all the iterative designs. Triple band with considerable impedance bandwidth can be observed from the results. A minimum bandwidth of 1.65 GHz is obtained at resonant Frequencies 2.4357 GHz, 3.6064GHz and 5.0201 GHz respectively with minimum return loss of -13.2801dB, -37.6648dB and -30.7880dB respectively. An impedance bandwidth of 36.4%, at first resonant frequency, 13.5% at second resonant frequency and 22% at third resonant frequency.

The subtracted area is in Fig 2.2 and the effective parameters are presented in Fig 4.
VSWR less than 2 at the operating bands can be observed from Fig 2.3. Fig 2.4 shows the input impedance of the antenna in smith chart. The corresponding impedance at the resonant frequencies are presented in this result.
Fig 3 shows the radiation pattern of the antenna with HPBW at 2.4357 GHz is 85.8231 deg, 3.6064 GHz is 83.4967 deg, and at 5.0201 GHz is 76.5330 in E-Plane. A peak realized gain of 2.34 dB is attained at 5.02 GHz from Fig 4.

The cross polarization is low compared to co-polarization from radiation pattern curves. The simulated current distribution is shown in Fig 5, which indicates the intensity of the current at feed and radiating element is more at lower bands than higher band.
CONCLUSION

An F-Shaped triple band model is designed and analyzed in the presence of defect ground structure in this work. The DGS is responsible for additional operating frequencies in the multiband. The slot structure on the patch surface creating long path for the current and increasing the electrical length of the antenna, which intern shifting the resonant frequency towards lower band. The proposed antenna is fabricated on FR4 substrate and the measurements of $S_{11}$ are taken on aniritsu vector network analyzer. The simulation results are having good correlation with measured results on the VNA. Proposed antenna is showing excellent radiation characteristics and gain at resonating frequency best suitable for medical band applications.

Ethical Clearance - Taken from ALRC of ECE, KLU

Source of Funding: This work is supported by ECR/ 2016/ 000569 and EEQ/ 2016/ 000604

** No Conflict of Interest**

REFERENCES


Circular Slotted Reconfigurable Antenna for Wireless Medical Band and X-Band Satellite Communication Applications

SK Rajiya¹, M Monika¹, B T P Madhav²

¹Scholars, ²Professor, Department of ECE, ALRC-R&D, Koneru Lakshmaiah Education Foundation, AP, India

ABSTRACT

Objective: A frequency reconfigurable circular slotted antenna fed by coplanar waveguide feeding (CPW) is presented in this paper. Analysis: The suggested antenna is compact in size with overall dimensions of 32mmx24mm to attain multiband operation. It covers Medical wireless communication WiMAX (3.03-3.8GHz), (5.1-5.5GHz) WLAN, C-band (6.5-7.16GHz) and X-band (9.4-12.5GHz) for radio astronomy, space research and satellite applications. Method: Resonating characteristics are realized by loading the two stage T-shaped stepped impedance resonator (TS-TSIR) in the circular ring and cross strip on the feed line. By placing four PIN diodes at the circular slot frequency shifting is obtained. Findings: The designed antenna shows maximum gain of 6.39dB at resonating frequency of 10.7GHz. Result: It shows good radiation pattern, impedance characteristics, low profile and suitable for wireless communication applications.

Keywords: TS-TSIR (two-stage T-shaped Stepped impedance resonator), CPW (coplanar waveguide), Cross strip.

INTRODUCTION

Recently, the demand on communication system has risen greatly. For radar and communication system, antennas are captious ingredients¹. The system performance is prescribed due to antenna characteristics. By incorporating many antennas with various operating frequencies in the same working floor multiple frequencies are attained which increases cost, weight of the system and also cross talk will be increased. To overcome all these drawbacks Reconfigurable antennas are preferred. In wireless communication, the reconfigurable antennas earned an extreme consideration as single antenna is sufficient to full fill the user demands². By adjusting the antenna radiating field the antenna can be reconfigured³-⁴. Depending upon the activity, the reconfigurable antennas have efficiency to adjust the field characteristics⁵. Reconfigurable antennas are capable to reconstruct its attributes like frequency, bandwidth, polarization and pattern to modify the environment⁶.

By adopting switching mechanism reconfiguration can be achieved. The approaches of Reconfigurable antennas are arisen in early 1930s⁷. Frequency reconfigurable antennas have symbolic consideration due to initiation of future wireless communication approach. To attain frequency reconfiguration many switches are usually used such as PIN diodes, RF MEMS, varactor diodes etc., depending upon the user demands the switches are preferred. Frequency reconfigurable pixel slot antenna is described in⁸. By utilizing band pass filter along with varactor diode, a frequency reconfigurable antenna is designed in⁹. Fractal dipole antenna¹⁰, Slot antenna¹¹. Frequency tunable antenna¹², U-slot antenna¹³. Frequency reconfigurable antennas have excited attention and cognitive radio is the good example for frequency reconfigurable antennas¹⁴-²⁰.

In this paper a CPW fed circular shaped frequency reconfigurable antenna is designed. By placing TSIR and cross strip multi band is realized. The final designed antenna covers the frequency range of 3.03-3.8GHz, 5.1-5.5GHz, 6.5-7.16GHz and 9.4-12.5GHz of WiMAX, WLAN, C band and X-band applications. PIN diodes are used for frequency shifting because it is more favourable easy to fabricate and low cost.
ANTENNA DESIGN

The suggested reconfigurable antenna model is shown in below figure1 which is implanted on RT/Duriod 5880 with relative permittivity of 2.2 and loss tangent of 0.0009. In order to reduce the weight of the system the designed antenna is in compact size with overall dimensions of 32mmx24mm and the substrate height of 0.8mm.

![Geometry of proposed antenna without switches and final designed model with switches](image1)

On top of the substrate initially the iteration 1 of the proposed antenna subsists of a circular radiating patch with radius p2=6.7mm with inner circle radius of p3=5.1mm is engraved with CPW transmission line. There is 0.2mm gap between the CPW ground plane and the transmission line is shown in figure 1(a). TS-TSIR is fixed on both sides inside the circular ring radiation patch which is represented in figure 1(b). In figure 1(c) cross strip is infused in CPW transmission line. Three rectangular slots are implanted on CPW transmission line to improve the frequency coverage and to attain multimode which shows in figure 1(d) 50ohms is the characteristic impedance of the transmission line with width of ws=3.6mm.

L=32, W=24, p1=11.4, p2=6.7, p3=5.1, s1=0.3, s2=3.1, s3=2.8, s4=4.5, s5=1, s6=2, v1=0.6, v2=5.6, v3=1, v4=2.6, v5=5, v6=8, v7=6, R=2, g1=0.2.

Four PIN diodes d1, d2, d3 and d4 are placed in the final design to achieve frequency shifting. Two switches are placed in TS-TSIR and two switches in rectangular slots on CPW transmission line. The dimensions of the suggested antenna is shown here.

RESULTS AND DISCUSSION

The accomplishment of the suggested antenna was investigated and illustrated by using HFSS software. Multi band is achieved for the suggested antenna structure. The antenna analysis is inspected in terms of return loss, VSWR, radiation pattern, gain, surface current distribution, electric current distribution and input impedance. Frequency shifting is achieved by placing four PIN diodes. The S11 curves of four antenna models are shown in Fig 2. The antenna model 1 covers the frequency range from 2.95-4.25GHz, 8.49-11.65GHz. After placing TS-TSIR on opposite sides inside the circular radiation patch the antenna model 2 covers the frequency range from 3.01-3.9GHz, 6.02-6.5GHz and 9.7-12.5GHz. Cross strip is inserted in the CPW transmission line the antenna model 3 covers the frequency range from 3-3.8GHz, 6.04-6.4GHz and 9.77-12.6GHz. The suggested antenna model after placing three rectangular slots on the feed line covers the frequency range from 3.1-3.91GHz and 9.6-12.6GHz.

![Antenna Parameter of S11 of models](image2)

After placing four PIN diodes frequency shifting is achieved. The comparison of return loss curves before and after placing switches is shown in Fig 2. When all four diodes d1, d2, d3 and d4 are in ON condition the designed antenna model covers the frequency range from 3.03-3.8GHz with return loss of -12.4dB for WiMAX application, 5.11-5.57GHz with return loss of -13.5dB for WLAN application, 6.5-7.1GHz with return loss of -26.1dB for C-band and 9.47-12.5GHz with maximum return loss of -27.16dB for radio astronomy, space research and satellite applications. The length of d1 and d2 is 0.7mm and width is 0.6mm. The length of d3 and d4 is 0.5mm and width is 0.5mm. The comparison of VSWR curves before and after placing switches is shown in Fig 2. ‘O’ means that the diode is in OFF condition and ‘1’ means that the diode is in ON condition.

When d1, d2, d3 and d4 are in OFF conditions the antenna covers the frequency range from 3.02-3.87GHz with return loss of -12.8dB, 5.14-5.55GHz with return...
loss of -13.3dB, 6.54-7.14GHz with return loss of -23.3dB and 9.47-12.58GHz with maximum return loss of -27.8dB. In case of d1, d4 OFF and d2, d3 are in ON condition the antenna covers the frequency range from 3.04-3.84GHz with return loss of -12.4dB, 5.23-5.69GHz with return loss of -12.5dB, 6.60-7.14GHz with maximum return loss of -25.6dB and 9.48-12.4GHz with maximum return loss of -28.2dB. In case of d1, d3 are in ON condition and d2, d4 are in OFF condition the antenna covers the frequency from 3.04-3.84GHz with return loss of -12.4dB, 5.23-5.69GHz with return loss of -12.5dB, 6.64-7.09GHz with return loss of -22.01dB and 9.4-12.3GHz with maximum return loss of -29.3dB.

The radiation pattern is used to represent the radiated energy by the antenna. The radiated characteristics are contrived in both E-plane and H-plane. The radiation pattern before and after placing switches are shown in Fig 3.

CONCLUSION

For wireless communication applications a frequency reconfigurable circular slot antenna is presented in this paper. To realize multi band operation at WiMAX, WLAN, C-band and X-band applications with centre frequencies of 3.3/5.2/6.5/10.7GHz. By placing four PIN diodes inside the radiator frequency shifting is attained. The designed structure shows good return loss (S11<-10dB) and VSWR criteria (VSWR<2) is satisfied at operating bands. The suggested antenna exhibits good radiation and impedance characteristics with acceptable gain.
Source of Funding: This work is funded by ECR/2016/000569, EEQ /2016/000604

Ethical Clearance: Taken from the department chair of KLEF and DDC members to publish this work. No Conflict of Interest.

REFERENCES


Tristrip Monopole Antenna with Split Ring Resonators for ISM Band Biomedical Applications

M Sujatha¹, B T P Madhav¹, V Prakhya², B Akhila², N Gowtham², S Mozammil², M Venkateswara Rao²

¹Professor, ²Scholar, Department of ECE, Koneru Lakshmaiah Education Foundation, Vaddeswaram, AP, India

ABSTRACT

Objective: A compact biomedical application-oriented antenna having complimentary split ring resonators at the flip side is presented in this letter. The frequency range 2.4 to 2.5 is mainly focused on the medical applications. Analysis: The proposed antenna gives the best solution for the compact, low profile, robust for the medical bands. The proposed structure analyzed using ANSYS electronic desktop and results has been carried out by using the FR4 substrate. Method: A normal rectangular patch antenna design has been taken with modified patch having three radiating strips connected to the feed line and the ground is modified with a complimentary split ring resonator. Findings: Proposed antenna is used to work at the ISM band which is best suitable for medical application. Result: It consists of almost 92% of efficiency towards radiation and a peak gain of 4dB with front to back ratio of 72%. In addition to that, an ideal radiation scenario is taken to perform time domain analysis to know the best possible way human body communication

Keywords: ISM band, Defected Ground Structure, Complimentary Split Ring Resonator.

INTRODUCTION

The want for portability and correspondence is profoundly imbued in human instinct and in any remote correspondence framework the radio wire is a basic segment. A radio wire is utilized to either transmit or get electromagnetic waves. It fills in as a transducer for changing over guided waves into free-space waves in the transmitting mode or the other way around in the accepting mode1,2. All receiving wires work on a similar essential standard of electromagnetic hypothesis detailed by James Clerk Maxwell. With the appearance of the data period, various propelled correspondence innovations have emerged amid the previous two decades which have extraordinarily affected and profited each field of our general public. The expansion of an ever-increasing number of highlights in each new age correspondence framework requests widespread receiving wires reasonable for task in numerous groups. Notwithstanding multiband task, it is fundamental that the reception apparatus is little, light weight, low profile and can be effortlessly incorporated with other microwave parts. With a specific end goal to achieve this, the reception apparatus can be manufactured onto a printed circuit board (PCB) and inserted into the packaging of gadgets3,5.

The electronic correspondence frameworks are unavoidable and indistinguishable piece of present day correspondence devices. The IEEE characterizes the reception apparatus or flying as “a method for emanating or accepting radio waves”. As a rule, a reception apparatus is a change gadget or a transducer, which change over guided wave into free space wave/photons OR it is an impedance coordinating gadget which coordinates the impedance of a transmission line with that of free space OR it is a gadget which change over electrical current in a specific recurrence into electromagnetic wave in a similar recurrence and the other way around. The extensive variety of use of receiving wires is accessible in different areas of electromagnetic range. The sort and property of reception apparatus relies upon the recurrence locale at which it works. The electrical and mechanical qualities together with working expense and working condition will decide the outline model for a specific radio wire. Receiving wires are used for correspondence and broadcasting as well as for the interesting field of
Presently a days Wireless Telecommunication innovation has changed the lives when contrasted with the past. In the homes, workplaces and Educational organization the versatile compact gadgets give more opportunity to such an extent that the correspondence with each other whenever and in wherever is conceivable. Today there are numerous utilization of remote correspondence in nearly in each zone, for example, Personal Communications Services (PCS), Wireless Personal Area Networks (WPAN), Wireless Local Area Networks (WLAN) and numerous other Telecommunication frameworks, which gives dependable remote associations between PCs, compact gadgets and buyer hardware inside a short range. Correspondence framework having reception apparatuses which assumes significant part in remote correspondence, so these framework requests to plan the receiving wires with expanded usefulness, better execution, decreased size and low advancement cost. Omni-directional receiving wires enhance motions every which way for accepting and transmitting which makes them more powerless to get commotion and more inclined to create clamor for different gadgets\textsuperscript{11-15}. Remote signs originating from different gadgets from different bearings will decrease the Signal to Noise Ratio (SNR) on a moronic Omni-directional receiving wire however not on a keen directional radio wire. It is conceivable to get change utilizing stupid directional reception apparatuses however that change is just gone for a solitary course. Putting a mechanical turn gadget on a settled directional receiving wire can tackle the bearing issue however it’s expensive and complex and has a moderate reaction time. The brilliant receiving wire utilizes a variety of reception apparatuses confronting an extensive variety of headings. The Digital Signal Processor (DSP) utilized as a part of keen receiving wire for all intents and purposes focuses the radio wire by just utilizing the bits of the reception apparatus that produce the most noteworthy SNR. Savvy Antennas are indispensable piece of frameworks because of high information throughput ability and low power necessities. As the developing interest for versatile interchanges is always expanding, the requirement for better scope, enhanced limit and higher transmission quality emerges. In this way, more proficient utilization of the radio range is required. Shrewd Antenna Systems (SAS) can do proficiently using the radio range and guarantee an effective answer for the 2 show remote framework issues while achieving dependable and powerful high-information rate transmission. In this article a compact antenna while works at the ISM band is simulated using HFSS software. Later the antenna is carried out with time domain analysis with two conditions face to face and side by side.

**Antenna Design:**

A compact antenna which is enclosed with partial ground having substrate material as FR-4 epoxy which is having the dielectric constant of 4.4 and loss tangent of 0.002. The proposed antenna having Ls * Ws having substrate thickness of 1.6mm. The proposed antenna analyzed using commercially equipped tool ANSYS electronic desktop. Simultaneously time domain analysis in two cases (face to face side by side), has done by using CST Microwave Studio. The proposed antenna works at ISM band 2.45GHz which is most frequently used for biomedical applications. The antenna has been analyzed through iteration wise. The below table gives the information of the dimensions of the proposed antenna. Based on the normal microstrip line design the resonant frequency, length, width are calculated for this proposed modal by using the below formulas

\[
E_{\text{reff}} = \frac{E_r+1}{2} + \frac{E_r-1}{2} \left(1 + 12 \frac{h}{W}\right)^{-1/2} \tag{1}
\]

\[
\Delta L = \frac{(E_{\text{reff}}+0.3)(W+h+0.264)}{(E_{\text{reff}}-0.250)(W+h+0.8)} \tag{2}
\]

\[
L = \frac{c}{2\text{Freq}\cdot E_{\text{reff}}} - 2\Delta L \tag{3}
\]

\[
W = \frac{c\sqrt{2}}{2\text{Freq}\cdot \sqrt{E_r+1}} \tag{4}
\]

\(E_r\) is the dielectric constant proposed antenna whereas, \(c\) is the speed of light in free space and \(h\) is the thickness of the material. \(L\) is the length of the antenna and \(W\) is width of the antenna. To reach the requirements of the biomedical applications the proposed antenna targeted to work in the ISM band region (2.45GHz). A compact size antenna has taken into consideration for the required frequency band. The layout of the proposed antenna has been seen below.
RESULTS AND DISCUSSIONS

Proposed antenna works at ISM band for biomedical application. The measured and simulated results coincide each other very well up to 7GHz, the proposed antenna works at three bands. The first band works from 2.4 to 2.75(ISM band). Second band works from 3.5 to 3.9(WLAN) and the third band from 6.6 to 6.75. We can also observe that a sharp rejection at the notch bands i.e., from 2.75 to 3.53(WLAN) and 3.8 to 6.6 is been observed.

Time Domain Analysis:

In modern communication system, correlations between the signals place a vital role. Especially, in antennas the transmitted strength should almost correlate with the receiving strength to get the proper communication in the channel. For this medical application-oriented antenna time domain analysis has been performed for two scenarios i.e., face to face, side by side for identical antenna by using CST software. Normally the input signal, transmitted signal and the received signal should not take much more than 2ns. Input signal of antenna at face to face condition is very much less than 1ns. Whereas the transmitted signal is extended up to 1.5ns. Received signal has distortion up to 2ns. This shows a strong correlation between the transmitted and received signal. The same behavior is also generated in side by side scenario, but a slight drop in the correlation between transmitted signal and received signal has been observed in the graph.

(a) Face to Face:

The two identical antennas have been kept face to face with 0.5 mm. The pulse transmission signals have been noticed to analyze the performance of both antennas. The below figures show the input, transmitted and received signals in this scenario.
CONCLUSION

A dual band antenna having complimentary split ring resonant at the ground has been investigated in this article. The proposed antenna designed to exhibit to the ISM band and at the 3.8GHz (Ymax) frequency. Parallely the time domain analysis has been carried out for the proposed antenna to check the correlation between them, when it is virtually placed on a human body. The front and back ratio which increases by 70% to obtain gain up to 4dB is also observed in this article. Thus, the proposed antenna consisting of CSRR in partial ground is a candour for the biomedical application.

Source of Funding: This work is funded by ECR/2016/000569, EEQ /2016/000604

Ethical Clearance: Taken from the department chair of KLEF and DDC members to publish this work. No Conflict of Interest.

REFERENCES


A CPW fed Dual Band Notched UWB Antenna for Wireless Medical Applications

K Phani Srinivas\textsuperscript{1,2}, Habibulla Khan\textsuperscript{3}, B T P Madhav\textsuperscript{3}

\textsuperscript{1}Research Scholar, Department of ECE, K L University, AP, India, \textsuperscript{2}Head R&D, Amrita Sai Institute of Science and Technology, Paritala, AP, India, \textsuperscript{3}Member IEEE & Professor, Department of ECE, K L University, AP, India

ABSTRACT

Objective: A new planar ultra wideband (UWB) antenna of dual notching bands is proposed and presented. The antenna has square patch and a defected grounded plane. Analysis: To experience dual notching characteristics, a small T-shaped stub is placed in the square slot at the patch and a double U-shaped strip placed beside the feed line. Method: The speciality of this current antenna is the high rejection level of notch in the stop band. Findings: The measured readings show that the designed notch planar antenna exhibiting wide bandwidth from 3 to 14 GHz and in voltage standing wave ratio with two notch bands of 3.5-4 GHz (WiMAX band) and 5–6 GHz (WLAN band), respectively. Results: The correlated measured results with simulation of the proposed antenna projecting that the designed antenna is a suitable for UWB applications.

Keywords: Ultra wideband (UWB), Notch, WLAN, Wi-Max, Stub

INTRODUCTION

UWB systems have a considerable spatial resolution in microwave imaging, which makes this technology suitable to study underground objects, using the technology known as Ground Penetrating Radar (GPR). From the last couple of years, there is a growth in UWB design for GPR applications as such designed systems can use a shorter pulse signal to enhance the resolution\textsuperscript{1-4}. This can be helpful in detection operations to target it for search and rescue purposes. Based on the integration of UWB GPR technology, several applications were reported previously in the field of engineering and research, which also includes the underground soil study\textsuperscript{5-10}, landmines detection, non-destructive testing study, remote sensing for search and rescue operations\textsuperscript{11-14}. To implement the UWB antenna devices in GPR applications, different antenna designs were reported which mainly involved horn, bow-tie, spirals, dipole, planar, slotted, and taper-shaped radiating antennas. These antennas were considered because of their design complexity, gain, directivity, and bandwidth, which are the main component specification for GPR applications\textsuperscript{15-18}. Among all mentioned designs planar antennas are in limelight and getting more attention, specifically due to its design simplicity, and other characteristics including gain and bandwidth. But because of limitation in the design, the properties of these antennas are also limited. Researchers are nowadays implementing different methods to obtain the high performance by maintaining the component compactness. To enhance the functionality of planar antennas, the developed methods included the operations with radiating patch or ground, namely Frequency Selective Surfaces (FSSs)\textsuperscript{16-20}, Electromagnetics Band Gaps (EBGs) and a modified ground study known as Defected Ground Structure (DGS)\textsuperscript{21-22}.

Antenna Geometry: Fig. 1 shows the structure of a wideband monopole antenna. The antenna is fabricated on FR4 substrate with dielectric constant of 4.4 and thickness of 0.8 mm. The radiating patch element and feeding line are printed on the front side of the substrate and the ground plane on the lower side. The width of the microstrip feed line is taken as 2 mm to achieve the characteristic impedance of 50 ohms.
\[ f_m \approx m \frac{c_0}{2d \sqrt{E_{eff}^{\text{slot}}}} \quad -- (1) \]

\[ n \approx \sqrt{\frac{Z_0^{\text{strip}}}{Z_0^{\text{slot}}}} \quad -- (2) \]

The reactance is,

\[ X_{L_C} = \frac{1}{\omega_0 C} \left( \frac{\omega_0}{\omega} - \frac{\omega}{\omega_0} \right) \quad -- (3) \]

Where \( \omega_0 \) is the angular resonant frequency.

The reactance of LPF for the above is given by

\[ X_L = \omega_1 Z_0 g_1 \quad -- (4) \]

Where \( \omega_1 \) is the normalized angular frequency, is the input and output port impedances and is the prototype element’ as described.

Equating (12.3) & (12.4) at the cut-off frequency, we have,

\[ X_{L_C} \bigg|_{\omega = \omega_0} = X_L \bigg|_{\omega = \omega_1} \quad -- (5) \]

\[ C = \frac{\omega_1}{Z_0 g_1} \left( \frac{1}{\omega_0^2} - \frac{1}{\omega_0^2} \right) \quad -- (6) \]

\[ L = \frac{1}{4\pi^2 f_0^2 C} \quad -- (7) \]

Where \( f_0 \) is the resonant frequency for DGS as well as the attenuation pole of the butterworth prototype. This loss resistance \( R \) can be extracted from simulated employing the following relation:

\[ R = \frac{2Z_0}{\left( \frac{1}{\omega_0^2} - \left( \frac{1}{\omega_1} - \frac{1}{\omega_0^2} \right) \right)^2 - 1} \quad -- (8) \]

Where,

\[ s_{11}(\omega) = \frac{Z_{in} - Z_0}{Z_{in} + Z_0} \quad -- (9) \]

### RESULTS AND DISCUSSION

By varying the gap \( g \) between patch and ground, the corresponding return losses for \( g = 1\text{mm}, 0.5\text{mm}, 1.5\text{mm} \) are shown below in Fig 2.
Fig 2. Parametric analysis of Return loss with change in gap between patch and ground

By varying the gap g between patch and ground, the corresponding VSWR plots for g=1mm, 0.5mm, 1.5mm are shown below.

Fig 3. Notched antenna model

The dimension of the antenna is designed to stop the frequency bands by placing notches as shown in the Fig 5. a=2 mm, b=2mm, s=14.5mm, f=13.5mm, m=14mm, n=13mm, g=1mm, K1=8mm, K2=5.5mm

Fig 4. Reflection coefficient curve of notch antenna

Notch frequencies are attained at 3.6985 GHz and 6.4422 GHz. Return Loss at Resonant frequencies is -17.8244 dB at 3.2412GHz, -21.4741 dB at 6.6382 GHz and -38.2271 dB at 9.3819 GHz. The radiation patterns of the proposed antenna were simulated in HFSS. The simulated far-field radiation patterns of the proposed dual-band-notched antenna in the E-plane and H-plane at the frequencies of 6.6 and 9.3 GHz are plotted in Fig. 5. The radiation patterns in the yz plane are nearly omnidirectional, but more directive in the higher band.

Fig 5. Radiation pattern of E and H-plane 6.6 GHz

Surface Current distribution at operating frequencies 6.6382 GHz and 9.3819 GHz are presented in Fig 6. It may note that the current elements are mainly spread round the filter model structures and oppositely oriented between the edges. Therefore, the resultant radiation fields can be cancelled out, and high attenuation near the resonant frequency is achieved, thus resulting in notched band.
CONCLUSION

In this article, a novel compact microstrip antenna with dual notch band characteristics designed for UWB applications and presented the analysis. Altering the gap between the patch and defected ground plane, a good impedance bandwidth is being achieved. By placing a T-shaped stub in the patch and with U-shaped parasitic elements side to the feed line, dual band stops for applications of WLAN and WiMAX are created. The radiation pattern characteristics of the antenna giving good omnidirectional performance parameters throughout the wideband frequency range and stable gain in the UWB band was realized. Accordingly, the designed antenna is proposed to be a good candidate in various wideband communication systems.

Source of Funding: This work is funded by ECR/2016/000569, EEQ/2016/000604

Ethical Clearance: Taken from the department chair of Amrita Sai Institute of Science and Technology and DDC members to publish this work. No Conflict of Interest.

REFERENCES


Frequency Switchable Monopole Antenna for Multi Band Wireless Medical Applications

U Ramya, G Jyothsna Devi, B T P Madhav

1Scholar, 2Professor, Department of ECE, Koneru Lakshmaiah Education Foundation, Vaddeswaram, AP, India

ABSTRACT

Objective: A frequency switchable monopole antenna fed by micro strip line feeding for Bluetooth, WiMAX and WLAN applications is proposed in this article. Analysis: The designed antenna dimensions are 37.0x25.5x0.8mm3. The proposed antenna comprises of 4 hemispherical rings, 1 orbicular ring, 3 rectangles and 1 arc shape ground plane. Method: The proposed antenna is designed and simulated by finite element method-based tool HFSS. Findings: The proposed antenna achieves frequency reconfiguration and the antenna is made switch to various frequencies by using 3 PIN diodes. Result: The antenna designed covers at 3 bands centred at 2.39GHz, 3.38GHz and 5.38GHz. The proposed antenna achieves a high efficiency of 95% and impedance bandwidth of 48%. The design exhibits compact size, good performance and low profile suitable to wireless system applications.

Keywords: Monopole antenna, switchable, frequency reconfiguration, PIN diodes.

INTRODUCTION

The wireless communication system development lead to increase in interest of designing various antenna designs of compact size. As the communication systems demand very high data rates, there will be huge traffic in turn leads to interference among several users that are using limited spectrum and broadband antennas easily allow noise signals into the RF circuits which lead to interference and make the system to work improperly. To overcome this, reconfigurable antennas are used1 and to operate antenna at several frequencies, several antennas are needing to be required which makes increase in cost of system. So, to make single antenna to operate at various frequencies switchable antennas are used.

Reconfigurability technique is used to alter not only frequency, it can alter the polarisation and pattern. To operate the wireless devices at various frequencies, frequency switchable antennas are used2. Compared to normal antennas, switchable antennas increase the performance of antenna3. These switchable antennas overtire abundant benefits like less size, low cost and compact4. These switchable aerials are used in future appliances like in MIMO systems and in multi frequency band wireless systems. By using switchable antennas, secondary users can also make use of unused bands without making any interference with dominant users5. By adjusting the diode states the antenna controls the current path. Among them PIN diodes are used due its simple structure and it can be easily integrated in PCBs6. By using switches, the antenna can work at various frequency bands hence frequency reconfigurability is acquired8.

To tune the antenna frequency continuously, varactor diodes are necessary otherwise RF MEMS and PIN diodes are enough to make tuning. Depending on the range of tuning and type of antenna, the type of RF tuning technology is decided. Using same antenna different operating modes with different operating frequencies can also be achieved9. Without placing any additional structures frequency switching can be done by changing diode states10. The switchable antennas should provide good efficiency, radiation pattern and impedance bandwidth. In11, frequency switching is obtained using PIN diodes. In12, Frequency switching is done using RF MEMS switches. In13, Frequency switching is done using varactor diodes.

Corresponding author :
B T P Madhav
E-mail: btpmadhav@kluniversity.in
In this paper, a frequency switchable antenna is proposed. The switching is done using 3 PIN diodes. The antenna is tuned to various frequencies by altering the values of capacitance of PIN diodes and by making the diodes on and off. The antenna is made to be switched to various frequencies\textsuperscript{14-24}. The diodes are actuated using DC bias lines. The proposed antenna operates at 3 frequency bands centred at 2.39GHz, 3.38GHz and 5.38 GHz covering Bluetooth, WiMAX and WLAN applications\textsuperscript{25-29}.

**ANTENNA DESIGN**

The designed antenna geometry is depicted in Fig. 1. It comprises of 4 hemispherical rings, 1 orbicular ring and 3 rectangles. PIN diodes are placed in between the 3 rectangles. It has defected ground of arc shape. In the designed antenna, the hemispherical rings cover the bands and the ground influences the antenna properties.

The designed antenna is fabricated on dielectric material FR4 epoxy substrate having $\varepsilon_r=4.4$, dielectric loss tangent of 0.02. The designed antenna size is 37x25.5mm\textsuperscript{2} having substrate height of 0.8mm. The 4 hemispherical rings radius are $R_1=6.5\text{mm}$, $R_2=5.5\text{mm}$ and orbicular ring radius are $R_3=3.5\text{mm}$, $R_4=2.5\text{mm}$. The designed antenna is working in 3 bands: 2.29-2.54GHz centred at 2.39 GHz, 3.21-3.71GHz centred at 3.38GHz, 4.82-5.82GHz centred at 5.38 GHz.

![Fig. 1 Proposed switchable antenna front and back geometry](image)

The size of the line feed is 2.5mmx12mm used to achieve good impedance matching. The proposed structure is a monopole antenna. As they are of less cost, easily integrated, less profile, less mass, constant gain, better performance, Omni directional pattern and more efficiency, these antennas are widely used. Table 1 depicts the proposed antenna dimensions. The major role of reconfiguration is switching. To make the antenna to be switchable, PIN diodes are used. The current is redistributed along the radiator by using PIN diodes.

In this, to make antenna to be switchable in frequency 3 PIN diodes named as D1, D2 and D3. BAR 63-03W having inductance of 0.45nH, resistance of 0.7Ω in on state and inductance of 0.45nH, capacitance of 0.2pf and resistance of 1.5kΩ are used in off state. The diode takes 0.095 seconds to switch from forward to reverse bias and it takes 0.7ms to switch from reverse to forward bias. The antenna is operating in 3 bands centred at 2.39GHz, 3.38GHz, and 5.38GHz for Bluetooth, WiMAX and WLAN applications. $W_{sub}=25.5$, $w_1=1.2$, $w_2=7$, $w_f=2.5$, $R_1=6.5$, $R_2=5.5$, $R_3=3.5$, $R_4=2.5$, $R_5=8$, $R_6=2.2$, $L_{sub}=37$, $L_1=1$, $L_2=0.75$, $L_f=12$, $L_g1=6.5$, $L_g2=7.19$, $L_g3=3$.

**RESULTS AND DISCUSSION**

The return loss corresponding to the diodes states are shown in fig.2. When all 3 diodes D1, D2, D3 are on then the antenna operates at 2.29-2.54GHz, 3.21-3.71GHz and 4.82-5.82GHz centred at 2.39GHz and 3.38GHz and 5.38GHz. When D1, D2, D3 are off on then the antenna operates at 2.31-2.67GHz and 4.04-5.86 centred at 2.48GHz and 5.29GHz. When D1, D2, D3 are off on then the antenna operates at 2.33-2.69GHz and 3.87-5.91GHz centred at 2.48 GHz and 5.39GHz. When D1, D2, D3 are off off on then the antenna operates at 2.32-2.69GHz and 4.11-5.87GHz centred at 2.49GHz and 5.28GHz.

![Fig. 2 Return loss versus frequency for various diode states](image)
### Table 1: Resonant frequencies and bandwidth for various diode states and for different capacitance values

<table>
<thead>
<tr>
<th>S.no</th>
<th>Diodes conditions</th>
<th>Capacitor values(pf)</th>
<th>Resonant frequency(GHz)</th>
<th>Bandwidth(GHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fr 1</td>
<td>Fr 2</td>
</tr>
<tr>
<td>1</td>
<td>State 1</td>
<td>C=0.2</td>
<td>2.49</td>
<td>5.28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=0.4</td>
<td>2.48</td>
<td>5.28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=0.6</td>
<td>2.47</td>
<td>5.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=0.8</td>
<td>2.48</td>
<td>4.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=1</td>
<td>2.49</td>
<td>3.78</td>
</tr>
<tr>
<td></td>
<td>State 2</td>
<td>C=0.2</td>
<td>2.48</td>
<td>5.29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=0.4</td>
<td>2.47</td>
<td>5.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=0.6</td>
<td>2.48</td>
<td>5.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=0.8</td>
<td>2.47</td>
<td>3.89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=1</td>
<td>2.47</td>
<td>3.79</td>
</tr>
<tr>
<td></td>
<td>State 3</td>
<td>C=0.2</td>
<td>2.48</td>
<td>5.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=0.4</td>
<td>2.47</td>
<td>5.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=0.6</td>
<td>2.48</td>
<td>3.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=0.8</td>
<td>2.47</td>
<td>3.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=1</td>
<td>2.48</td>
<td>3.68</td>
</tr>
<tr>
<td>4</td>
<td>State 4</td>
<td>-------------------</td>
<td>2.39</td>
<td>3.38</td>
</tr>
</tbody>
</table>

### Table 2: Illustrates the impedance bandwidth, gain and efficiency at resonant frequencies for various diode states and for different capacitance values.

<table>
<thead>
<tr>
<th>Diodes conditions</th>
<th>Capacitor values(pf)</th>
<th>Resonant frequency(GHz)</th>
<th>Impedance Bandwidth (%)</th>
<th>Gain at resonant frequencies(dB)</th>
<th>Efficiency at resonant frequencies(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fr 1</td>
<td>Fr 2</td>
<td>Fr 3</td>
<td>BW1</td>
<td>BW2</td>
</tr>
<tr>
<td>State 1</td>
<td>C=0.2</td>
<td>2.49</td>
<td>5.28</td>
<td>-----</td>
<td>14.8</td>
</tr>
<tr>
<td></td>
<td>C=0.4</td>
<td>2.48</td>
<td>5.28</td>
<td>-----</td>
<td>14.1</td>
</tr>
<tr>
<td></td>
<td>C=0.6</td>
<td>2.47</td>
<td>5.39</td>
<td>-----</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>C=0.8</td>
<td>2.48</td>
<td>4.39</td>
<td>-----</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>C=1</td>
<td>2.49</td>
<td>3.78</td>
<td>5.29</td>
<td>12.4</td>
</tr>
<tr>
<td>State 2</td>
<td>C=0.2</td>
<td>2.48</td>
<td>5.29</td>
<td>-----</td>
<td>14.5</td>
</tr>
<tr>
<td></td>
<td>C=0.4</td>
<td>2.47</td>
<td>5.39</td>
<td>-----</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>C=0.6</td>
<td>2.48</td>
<td>5.38</td>
<td>-----</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>C=0.8</td>
<td>2.47</td>
<td>3.89</td>
<td>5.38</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>C=1</td>
<td>2.47</td>
<td>3.79</td>
<td>5.28</td>
<td>12.5</td>
</tr>
<tr>
<td>State 3</td>
<td>C=0.2</td>
<td>2.48</td>
<td>5.39</td>
<td>-----</td>
<td>14.5</td>
</tr>
<tr>
<td></td>
<td>C=0.4</td>
<td>2.47</td>
<td>3.79</td>
<td>-----</td>
<td>14.5</td>
</tr>
<tr>
<td></td>
<td>C=0.6</td>
<td>2.48</td>
<td>3.68</td>
<td>5.29</td>
<td>14.5</td>
</tr>
<tr>
<td></td>
<td>C=0.8</td>
<td>2.48</td>
<td>3.68</td>
<td>5.29</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>C=1</td>
<td>2.48</td>
<td>3.68</td>
<td>5.29</td>
<td>11.6</td>
</tr>
<tr>
<td>State 4</td>
<td>D1 on</td>
<td>2.39</td>
<td>3.38</td>
<td>5.38</td>
<td>10.4</td>
</tr>
<tr>
<td>D2 on</td>
<td>D3 on</td>
<td>2.39</td>
<td>3.38</td>
<td>5.38</td>
<td>10.4</td>
</tr>
</tbody>
</table>
Table 2: Impedance Bandwidth, Gain and Efficiency at resonant frequencies for various diode states and different capacitance values

Gain and Efficiency versus frequency when all the 3 diodes are in on state is illustrated in fig. 3. The gain reaches max value of 4.49dB at 5.28 GHz and the maximum efficiency obtained is 95.6%.

Fig. 3 Gain and Efficiency versus frequency

Table 3: Comparison of proposed antenna with previous works

<table>
<thead>
<tr>
<th>Ref no</th>
<th>Antenna size(mm)</th>
<th>No of diodes</th>
<th>Efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1]</td>
<td>60mmx50mmx1.6mm</td>
<td>6</td>
<td>82</td>
</tr>
<tr>
<td>[4]</td>
<td>30mmx70mmx1.6mm</td>
<td>2</td>
<td>93</td>
</tr>
<tr>
<td>[6]</td>
<td>50mmx60mmx0.8mm</td>
<td>2</td>
<td>86</td>
</tr>
<tr>
<td>[7]</td>
<td>55mmx5mmx3mm</td>
<td>1</td>
<td>82</td>
</tr>
<tr>
<td>[8]</td>
<td>60mmx71.7mmx1.6mm</td>
<td>4</td>
<td>87</td>
</tr>
<tr>
<td>[9]</td>
<td>60mmx5mmx5mm</td>
<td>1</td>
<td>64.7</td>
</tr>
<tr>
<td>[12]</td>
<td>40mmx40mmx1.27mm</td>
<td>3</td>
<td>93</td>
</tr>
<tr>
<td>Proposed antenna</td>
<td>37mmx25.5mmx0.8mm</td>
<td>3</td>
<td>95.8</td>
</tr>
</tbody>
</table>

Table 3 depicts the comparison of proposed antenna with previous works

CONCLUSION

A frequency switchable antenna is proposed for Bluetooth, WiMAX, WLAN applications. The antenna is made switchable using 3 PIN diodes. The designed antenna operates in 4 states: off off off, off off on, on on on. When all diodes are in off state, it covers frequencies of 2.32-2.69GHz, 4.11-5.87GHz. When diodes are in off off on states, it covers frequencies of 2.31-2.67GHz, 4.04-5.81GHz. When diodes are in off on state, it covers frequencies of 2.33-2.69GHz, 3.87-5.91GHz. When diodes are in on on on state, it covers frequencies of 2.29-2.54GHz, 3.21-3.71GHz, and 4.82-5.82GHz. By making control of diode states, the current distribution can be altered.

Source of Funding: This work is funded by ECR/2016/000569, EEQ/2016/000604

Ethical Clearance: Taken from the department chair of KLEF and DDC members to publish this work. No Conflict of Interest.

REFERENCES


Image Processing based Segmentation Techniques for Spinal Cord in MRI

SK Hasane Ahammad¹, V Rajesh²

¹Research Scholar; ²Professor, Department of Electronics and Communication Engineering, Koneru Lakshmaiah Educational Foundation, Vaddeswaram, Guntur, India

ABSTRACT

Objective: Medical image processing is given importance in the area of recent research. This facilitates the clinician to diagnosis, analyze, prognosis traumatic diseases. There is a huge need for human body parts which are broken down will assess the infections alternately discomforts in the human body. Analysis: The analysis is performed by using various computed tomography (CT) and Magnetic resource imaging (MRI) techniques based on image based inputs. Examination of such images for medical analysis needs some profound image transforming techniques. Method: Image division is that fundamental process, which segments the wanted image starting with those scanned images. Spinal cord division and analysis of neuro-degenerative and traumatic maladies are emerging techniques in medical mining. Findings: In this paper, a set of image transforming techniques and different strategies to spinal cord division is reviewed. This overview at last gives those framework of the earlier researches with those merits and demerits.

Keywords: Traumatic; Neuro-denegerative; Medical Imaging; MRI; Spinal cord

INTRODUCTION

In recent years all around the world, more than 50,000 members suffer from spinal cord injury (SCI) which is most unpreventable injury caused by natural falls from high buildings, road accidents or by violence. People suffering from spinal cord injuries die prematurely two to five times compared to normal injuries¹. With more awful survival rates clinched alongside low- and middle-income nations. Spinal cord damage will be connected with lower rates of school enlistment and also in budget, which carries significant unique and societal costs.

Understanding spinal line injury: The term ‘spinal cord injury’ illustrates on harm of the spinal cord coming about of trauma (e. g. A automobile crash) or from sickness or degeneration (e. g. Cancer). There is no dependable assess about worldwide prevalence, but expected worldwide incidents may be 40 to 80 cases for every million population. Indications might include complete loss of sensory function or reduction about tactile , alternately loss of control of arms, legs or body. The most severe spinal cord injury affects the systems that regulate bowel or bladder control, breathing, heart rate and blood pressure. Most people with spinal cord injury experience chronic pain.

Demographic trends: Males are most at risk in young adulthood (20-29 years) and older age (70+). Females are most at risk in adolescence (15-19) and older age (60+). Studies report male-to-female ratios of at least 2:1 among adults, sometimes much higher.

Finding What’s more analysing the spinal line with morphologic offers are that’s only the tip of the iceberg important for clinical requisitions². Those morphologic offers similar to cross sectional size shape and so forth. This paper provides for the diagram of the spinal line division process, strategies Furthermore devices utilized within that to point of interest. That goal for this paper is should supply a review about division techniques for that human spinal line What’s more spinal trench which would distribute as of late. In those all considerations regarding spinal line division utilizing mri securing Also acceptance for division calculations need aid reviewed. Then, systems included with those division for spinal line Furthermore other restorative imaging as stated by their division instruments may be concentrated on.

LITERATURE REVIEW

In paper³, creators find those associations of cerebrum cervical string volume will discover those
abnormality and co-morbid states for clinical inability. The writers evaluated the cervical string volume, which aides in the clinical screening frameworks.

The writers done suggested two algorithms, which holds the intervertebral plate restriction step, and the verst ID number and division step. In the introductory step, creators apply a model-based seeking technobabble with find every last one of intervertebral plate bits about majority of the data between neighbouring vertebral of the whole spine and the best slice decision. An additional approach using a power profile for a polynomial limit for fitting every last bit these plate ends alternately circle clues from claiming data on the best cut is then used to refine those circissiliquastrum search methodology. For the appraisal of the farthest point extraction of 22 vertebrae, the computation adequately figures 100%, 96. 6%, 93.2%, 95.5%, 87. 5% verst corners to picture situated no. 1, 2, 3, 4, Furthermore 5, separately. At these preparatory conclusions would guaranteeing. A key purpose of the above examinations is to achieve the accuracy. The methodology is totally programmed for the entire spine.

In paper, authors measured the cervical spinal cord volume of health users. This evaluates the relationships between the health user’s morphological features and abnormal users. Creators Think as of that those cervical spinal line volume proportion might make used to assess cervical spinal line decay in patients with cervical myelopathy and could a chance to be paramount data over searching for clinically discriminating focuses. Those cervical spinal line volume might have been bigger to guys over in the females, diminished for age.

In paper, recommended An blending of division calculations which combines those object distinction Furthermore anatomic information. This permits the framework on fragment Furthermore recreate the pertinent delicate tissue structures In those cervical spine and the region. Writers bring demonstrated that automatic, prominent division about delicate tissue from mri pictures may be practical. The algorithm was tested on nine different T1 and T2 weighted MRI images. The experiments demonstrated the robustness of the algorithms. The computation time for the sample dataset (128 slices of 256 256 pixels) remained under 1 minute on a standard computer.

Done paper, creators suggested a programmed division system that extracts those spinal line for mri pictures about lumbar spine string datasets; they utilized a gradient vector stream (GVF) field traile toward An associated part Investigation for division. Mr pictures taken starting with 52 subjects Also that would utilized on division. This need quantitatively compared against reference division eventually Tom’s perusing two medicinal masters. However, the division strategy is not suitableness to machine helped finding (CAD) from claiming a great part lumbar-related pathology. This brings about those Insufficient division.

Previously, paper, creators need showed a fast system for segmenting the spinal line from mr images, What’s more bring indicated its helter skelter inters- and intra eyewitness reproducible with respect to 3-D T1 - weighted pictures of the mankind’s cervical string. To some degree on the string region might have been evaluated through An bigger degree of the string (approximately80 mm, contrasted with the 15 mm of the Losseff method). By The point when the string ranges were measured again those same anatomic extend Concerning illustration will be utilized within the Losseff method, both those intra- Furthermore Bury eyewitness variability’s were still Extensively superior for the as technique demonstrating a innate profit from claiming utilizing An surface model for smoothness imperatives.

In paper, a variety of medical image segmentation algorithms exists, but seldom is any single algorithm able to address a complex image segmentation problem. In this paper, authors focused on the challenging problem of spinal cord segmentation and made the following observation that allowed us to propose a novel and robust algorithm. Therefore, authors combined an enhanced crawler method (artificial life segmentation framework with optimal local tubularness filters), with LW (minimal path guaranteeing global optimality). Authors obtained superior results using the hybrid method compared to those without any LW guidance.

Clinched alongside paper, creators suggested a toponomy preserving approach to tending to those programmed division about spinal line. Spinal line pictures need aid not standard and mr complexity is not ideal always, henceforth writers depicted those calculation on make effectively versatile. So, those developments of fundamental atlases starting with a single manual division What’s more planning need performed. The creators picked up that’s only the tip of the iceberg precision in the provided for dataset.
In paper\textsuperscript{11}, authors presented a new automatic segmentation method named as Propseg. This Propseg improves the accuracy and speed. This overcomes the problem of segmenting of manual method and active surface method. The paper gained successful result on T1-, T2- and T2*- weighted contrasts with different image resolution. This includes the cervical, lumbar and thoracic spinal cord. However, the technique improves the accuracy, the computational time is high.

In paper\textsuperscript{12}, authors provided a group wise for segmenting spinal cord internal structure. For the automatic segmentation, a list of techniques was proposed. Pre-aligning the slice –based atlases into group wise consistent space, constructing the model of spinal cord variability, the authors used cost function using model specific registration and finally the authors estimated the robust segmentation process.

In paper\textsuperscript{13}, authors described the framework to develop an unbiased average anatomical template of the spinal cord. This utilizes the non-linear registration and series of pre-processing steps. The template is useful to measure the spinal cord cross sectional area, vertebral levels, voxel based morphometry, white and gray matter location etc., this paper have many advantages and this also incurs more computational overhead. And this is useful only for the defined template.

In paper\textsuperscript{14}, authors presented morphological characteristics of the complete spinal cord. The paper failed to detect the state of differences in state. Morphological invariants, which could be used to calculate the normally expected morphology accurately, were also identifying. These observations should benefit to biomechanical and spinal cord pathology studies.

In paper\textsuperscript{15}, suggested an moved forward technique for measuring spinal line cross-sectional zone (CSA) utilizing attractive reverberation imaging (MRI) for different sclerosis (MS). In the paper, mri might have been performed once A large number different sclerosis patients. At this chance point, an extra examine might have been procured to assess scan–rescan reproducible.

**SPINAL CORD EXTRACTION FRAMEWORK**

MRI spine plays a very important role in diagnosing various spinal diseases, such as slipped vertebra, herniated disk, and disk/vertebra degeneration, and it can give a hand in evaluating treatment progress for patients with symptoms after spinal surgery. A case in point, Osteoporosis is a disease that affects a significant proportion of old people.

The figure 1.0 reveals to a example mri picture and the division from claiming spinal line. Those division about MRI pictures and finding those morphologic features would contemplated in\textsuperscript{16}. Picture division might a chance to be finished with respect to 2D or 3d pictures manually, semi-automatically or fully naturally.
The automatic MRI spine image segmentation framework is as shown in Figure 2. The segmentation algorithm consists of a sequence of processing steps shown in flow diagram form in Fig. 2 and include 4 steps: 1) Acquisition of MRI spine image sequence; 2) Select the clearest image of the sequence; 3) Image preprocessing; 4) Spinal Cord extraction;

Initially the image of Spinal cord is acquired from MRI scanner. The sample sequence of MRI is processed through preprocessing step. In the preprocessing, we enhance the contrast of the image firstly, and then apply a 3-by-3 median spatial filter because of its demonstrated ability to reduce random noise without blurring edges as much as a comparable linear low-pass filters\(^17\). Spinal cord is a remarkable structure in spine images, and can give the tracking direction of the disks. In order to extract spinal cord from a complex scene, we use statistical pattern recognition method to shrink the region of the spinal cord for further processing. Images sequences from 10 patients are chosen as the training set in this study.

**SEGMENTATION METHODS**

Image Segmentation has several techniques for dividing the images into segments. Each technique has its own features. All these techniques follow mainly two basic approaches for image segmentation\(^18\). The two approaches are: Region based approach and edge based approach. All techniques of image segmentation are broadly divided into four parts. These are as follows:

**A. Thresholding Method**

The most popular and commonly used method for image segmentation is Thresholding methods. In this method, image pixels are divided with the help of intensity level of an image. This method is mainly used to distinguish the foreground objects from background images. In this objects are lighter than its background\(^19\). Selection of this method depends upon our prior knowledge. The thresholding method is broadly classified into three categories.

Global Thresholding: Global Thresholding is based on selecting an appropriate threshold value i.e. T. This T is a constant and output image depends upon this T value.

Variable Thresholding: Another type of thresholding method is Variable thresholding. In this method, the value of T varies over an image.

**B. Edge Based Segmentation method**

A connected pixel that is found on the boundary of the region is called an edge. So these pixels on an edge are known as edge points\(^20\). Edge can be calculated by finding the derivative of an image function. Some edges are very easy to find. These are: Ramp edge, Step edge, Roof edge, Spike edge. Step edge is an abrupt change in intensity level. Ramp edge is a gradual change in intensity. Spike edge is a quick change in intensity and after that returns immediately to an original intensity. Roof edge is not instantaneous over a short distance. Edge based image segmentation method falls under structural techniques\(^21\).

**C. Region Based Segmentation Method:**

This method is based on segmented an image on the basis of similar characteristics of the pixels. Region Based segmentation method is further divided into two
Region growing: Region growing is a procedure that group’s pixels in whole image into sub regions or larger regions based on predefined criterion. The region growing based segmentation methods are the methods that segments the image into various regions based on the growing of seeds (initial pixels). These seeds can be selected manually (based on prior knowledge) or automatically (based on particular application). Then the growing of seeds is controlled by connectivity between pixels and with the help of the prior knowledge of problem, this can be stopped.

Split and Merge: Two parts: Initially the whole image which is taken as a single region is repeatedly split until no more splits are possible, Quad tree is a splitting data structure, then two regions are merged if they are adjacent and similar, merging is repeated until no more merging is possible.

D. Watershed Based Method

The watershed based method uses the concept of topological interpretation. In this the intensity represents the basins having hole in its minima from where the water spills. When water reaches the border of basin the adjacent basins are merged together. The watershed methods consider the gradient of image as topographic surface. The pixels having more gradient are represented as boundaries which are continuous.

Thresholding     Edge detection     Graph
Templates Deformable Hybrid

Figure 3.0 Spinal cord Segmentation Hierarchy

Those state of those spinal line is a long Furthermore plain format; this may be verwoerd near large portions anatomic structures, Along these lines segmenting the spinal line naturally Also faultlessly is that’s only the tip of the iceberg testing What’s more muddled. To attain secondary correctness. Those classifications for high-keyed division systems are gained starting with and indicated Previously, figure 3.0. From those large amount division methods, the majority usage need aid conveyed crazy. Those classifications incorporate the intensity, surface Also picture built division. Those extensions of arrangement what’s more division systems are portrayed in the figure 3.0.

Ethical Clearance- Taken from department of ECE, KLEF

Source of Funding: No funding

***No Conflict of Interest***

CONCLUSION

The reason for this paper may be should describe the existing routines for segmenting and dissecting the human spinal line starting with mri information. Furthermore of the methodological depiction of the division algorithms, the survey secured distinctive proposals identified with segmentation, including morphologic features, picture pre-processing, and acceptance strategies. The pros/ cons for existing spinal line division calculations could make summarized similarly as takes after. Intensity-based techniques would proficient Furthermore fast, yet the vicinity of pathology, artifacts, or poor cord/ CSF complexity camwood yield errors, requiring client intercession alternately methodologies to regularization. Co-registration to committed format alongside vertebra or spinal line level ID number ought Additionally encourage those division.

REFERENCES


Nida M. Zaitouna, Musbah J. Aqelb


Trapezoidal Notch Band Frequency and Polarization Reconfigurable antenna for Medical and Wireless Communication Applications

B Siva Prasad1,2, P Mallikarjuna Rao3, B T P Madhav4

1Research Scholar, Department of ECE, Andhra University College of Engineering, Visakapatnam, India, 2Associate Professor, Department of ECE, Baba Institute of Technology and Sciences, Visakapatnam, India, 3Professor, Department of ECE, Andhra University College of Engineering, Visakapatnam, India, 4Professor, Antennas and Liquid Crystals Research Centre, Department of ECE, Koneru Lakshmaiah Education Foundation, AP, India

ABSTRACT

A compact trapezoidal slotted notch band monopole antenna is designed with frequency and polarization reconfigurability. The proposed antenna is designed on FR4 substrate with permittivity 4.4 and loss tangent 0.025. Trapezoidal antenna is operating in the range of 0.9 to 3.8 GHz, which is covering GPS, GSM, PCS, UMTS, ISM, Bluetooth, LTE and Wi-Fi and medical applications. Trapezoidal antenna with slot on the radiating element is providing notch band characteristics in the range of 1.6-2.2 GHz, which is blocking GSM, PCS and UMTS application bands. Reconfigurability is attained with placement of PIN diodes in the modified trapezoidal monopole structure. Antenna can be fine-tuned between 1.5 to 3.5 GHz (Medical ISM band and wireless communication applications) with diodes switching operation and has a pattern tilt of -30° to +30°. The measured results are providing good correlation with simulation results obtained from the CST microwave studio.

Keywords: Frequency Reconfigurability, Notch Band, Polarization Reconfigurability, Trapezoidal Antenna.

INTRODUCTION

Antennas with fixed frequency band and radiation pattern can be used for single service. This results in usage of more antennas for applications seeking multiple radios. For emerging wireless applications, antennas with small size, less interference, low cost, and least complexity are required. To obtain these characteristics, reconfigurable antennas are used. A single reconfigurable antenna can perform the operation of multiple antennas1-4. In recent times, compound reconfiguration is explored in literature in which an antenna can reconfigure multiple performance metrics.

There are three types of frequency-reconfigurable antenna structures that are major candidates for multiradio wireless platforms: patch antennas, wire antennas, and PIFAs. Each employs a distinct mechanism to achieve the required frequency reconfigurability. First, for the patches, a variety of slots are usually introduced to detour the current path on the patch antennas to control their resonances5-12. The length of these slots can be controlled by switches to reconfigure the patch antenna’s operating frequency. Second, for the wire antennas, the resonant frequency is primarily defined by its length or perimeter, which also can be controlled for reconfigurability12-16. For example, a monopole antenna has its first resonance when its length is about a quarter-wavelength, while a loop antenna resonates at a frequency where its perimeter is approximately one wavelength. Subsequently, various switches can be implemented to alter the length or perimeter of these wire antennas to allow operation over different frequency bands17-22.

In this article, we focus on frequency-reconfigurable antenna structures that are suitable for implementation
on consumer-type mobile multi radio platforms. Such antennas are usually equipped with switches that are controlled by dc bias signals. Upon toggling the switch between on and off states, the antenna can be reconfigured to support a discrete set of operating frequencies. This letter presents a simple antenna that can reconfigure its frequency and radiation pattern. The dynamic nature of the antenna has ability to overcome the drastic effects of the time-varying channels. Also, if more than one parameter is reconfigured at a given instant, the spectrum efficiency of the wireless link can be greatly enhanced [5-8]. A comparison between the multiband, wideband and frequency reconfigurable antenna with respect to the performance characteristics are presented in Table 1. This is providing an overview regarding the choice of antenna for different applications.

2. Antenna Geometry: The antenna consists of a planar monopole element which is fed by a co-planar waveguide. The monopole element is rectangular but with its bottom edges tapered. A U-shaped slot is cut into the monopole element. The co-planar waveguide feed means that the ground plane is in the same plane as the antenna. The antenna is usually fabricated by etching a metallized dielectric substrate. The monopole is fed at its base by a co-planar waveguide. The inner section of the waveguide can be connected directly to some connector or drive electronics and driven with respect to the outer ground conductors. At low frequencies, the antenna operates as a conventional monopole except that the ground plane is in the same plane as the antenna. At higher frequencies, the tapered base forms a gradually widening slot with respect to the ground plane, providing a good impedance match. The operation of the antenna is essentially independent of the slot, except for frequencies close to where the slot is resonant. At this point, the slot presents a high impedance barrier to current flowing up along the monopole.

![Fig 1. Proposed Reconfigurable Antenna](image)

The trapezoidal monopole is designed to have an S11 (with respect to 50 Ω) of below -10 dB across operating band. Low permittivity substrates tend to require very narrow gaps in the co-planar waveguide when designed for a 50 Ω line impedance. This makes it difficult to fabricate. In addition, the metal thickness may be of the same order as the gap width, leading to lower line impedance.

The length of the element determines the minimum operating frequency

The S11 can be minimized over the operating band by adjusting the taper angle and feed gap.

Further S11 reduction may be obtained by cutting optimized notches or steps in the base or top of the monopole element

Initially basic trapezoidal monopole antenna is analyzed and the corresponding results are presented in this section. The voltage at the input port location is computed from the Ez field components at the feed point over the entire simulation time interval. The current at the feed point is calculated from the H field values around the feed point using Ampere’s circuital law. The input impedance of the antenna is computed as

\[ Z_{in}(w) = \frac{FFT(V_n, P)}{FFT(I_{n-1}, P)} \] 

Since microstrip line is modelled using Leubber’s staircase approach, the internal impedance Rs is taken as the characteristic impedance (Z0) of microstrip line. Return loss in dB.

\[ S11 = 20 \log_{10} \Gamma(\omega) \] 

Radiation pattern is a mathematical function or graphical representation of the radiation properties of the antenna as a function of space coordinates. Radiation properties include power flux density, radiation intensity, field strength, directivity phase or polarization. In practice, the three-dimensional pattern is measured and recorded in a series of two dimensional patterns. However, for most practical applications, a few plots of the pattern as a function of θ for some values of ϕ, plus a few plots as a function of ϕ for some values of θ, give most of the useful and needed information. The notch band antenna is constructed with placement of slot in the trapezoidal antenna model.

\[ f_{\text{notch}} = \frac{C}{2L\sqrt{\varepsilon_{re}}} \] 

Where L is the total length of the slot, which here is described as Lsb, ε_{ref} is the effective dielectric constant,
and \( c \) is the speed of light. Taking Equation 3 into consideration, the length of the slot at the beginning of the design is determined and then later adjusted for the final design. The notch band is ranging from 1.7 GHz to 2.3 GHz. The radiation of the microstrip antenna is determined from the field between the metal patch and the ground plane. Opposite charges are established on the bottom of patch and top of the ground plane when the patch is excited. The attractive force will hold most of the charges between the two surfaces. In the meantime, the repulsive forces of the same charges on the patch surface will push some of the charges to the edges creating fringing fields which is the reason why patch antenna resonates.

4. Reconfigurable antenna results and analysis:
The trapezoidal notch band antenna is modified by etching slots in the ground plane and placing PIN diodes in the junction. Now the notch band antenna is converted in to reconfigurable notch band antenna with the diodes switching condition. Fig 1 shows the reconfigurable antenna structure. The operational characteristics of the antenna can be analyzed with switching operation of the PIN diodes placed at slot junctions. Fig 2 shows the switching operation of the diodes and the corresponding change in the operating frequency. When D1 is ON and remaining are OFF, then antenna showing notch band from 2.2-2.4 GHz. When D2 is ON and remaining are in OFF, then antenna showing notch band from 2.3-2.5 GHz. Similarly, for D3 ON, the notch band shifted to 2.4-2.6 GHz and D4 ON shows notch band at 2.5-2.7 GHz. Fig 2 shows some special cases where diode switching in not affecting the frequency reconfigurability in the efficient manner. Fig 2 shows the conditions where the notch bands are disappeared, and antenna is working like wideband antenna. Table 1 shows the frequency response corresponding to switching condition of the diodes. Especially the diode 5 showing small improvement in the operating band 2-3 GHz with bandwidth of 1 GHz, whereas in the remaining cases the bandwidth is 0.9 GHz only in the operating band.

In the parametric analysis the main slot length is varied from 5 to 9mm and the best fitted dimension is extracted. The main slot width is varied from 1.1 to 1.6 mm and the optimized dimension is chosen for fabrication. The proposed antenna is not only showing the frequency reconfigurable behaviour, but also exhibiting polarization reconfigurable nature also. Fig 3 is giving the evidence for the polarization reconfigurability of the proposed antenna at two operating frequencies 1.9 GHz and 3.8 GHz respectively. Fig 3 shows that the E-plane pattern is directed towards 30º and 330º at 1.9 GHz (D1D2D3D4D5=10001 & D1D2D3D4D5=01100).

<table>
<thead>
<tr>
<th>S. No</th>
<th>D1 D2 D3 D4 D5</th>
<th>Operating Band</th>
<th>Notch Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 0 0 0 0</td>
<td>1.6-3.5 GHz</td>
<td>2.2-2.4 GHz</td>
</tr>
<tr>
<td>2</td>
<td>0 1 0 0 0</td>
<td>1.7-3.4 GHz</td>
<td>2.3-2.5 GHz</td>
</tr>
<tr>
<td>3</td>
<td>0 0 1 0 0</td>
<td>1.8-3.3 GHz</td>
<td>2.4-2.6 GHz</td>
</tr>
<tr>
<td>4</td>
<td>0 0 0 1 0</td>
<td>1.9-3.2 GHz</td>
<td>2.5-2.7 GHz</td>
</tr>
<tr>
<td>5</td>
<td>0 0 0 0 1</td>
<td>2-3 GHz</td>
<td>2.6-2.8 GHz</td>
</tr>
</tbody>
</table>

**Fig 3. Polarization Reconfigurability at 1.9 GHz (30º and 330º)**
The proposed antenna is prototyped on Nvis 71 machine and reflection coefficient is measured on Anritsu combinational analyzer. PIN diodes are soldered at respective positions and the switching operation is verified. Measurement results are in good agreement with simulation results as shown in Fig 4.

CONCLUSION

A trapezoidal notch band monopole antenna is converted into reconfigurable antenna. Frequency reconfigurability and polarization reconfigurability is attained with the PIN diodes switching operation at the selected locations of the slots on the antenna structure. Frequency tuning of almost 3 GHz is attained in the operating band and polarization tunability of +/-30° with diode switching is observed for the proposed antenna model. The peak realized gain of more than 4.7 dB with average efficiency of more than 72% made this antenna more suitable for wireless communication applications. The measured results are providing good correlation with simulation results and this model can be used for ISM band medical applications and other wireless communication applications like GPS, GSM, PCS, LTE and Wi-Fi.

Source of Funding: Self.

Ethical Clearance: Taken from the department chair of Baba Institute of Technology and Sciences and DDC members to publish this work. No Conflict of Interest.

REFERENCES


Sierpinski Meta Fractal Monopole Antenna with Defected Ground Structure for Medical and Satellite Communication Applications

S Ram Kumar\textsuperscript{1,2}, M V S Prasad\textsuperscript{3}

\textsuperscript{1}Research Scholar, Department of ECE, Acharya Nagarjuna University, AP, India, \textsuperscript{2}Assistant Professor, Department of ECE, Lingayas Institute of Management and Tech., AP, India, \textsuperscript{3}Professor, Department of ECE, R.V.R & J C College of Engineering, AP, India

\section*{ABSTRACT}

\textbf{Objective:} A sierpinski gasket monopole antenna has been designed with defected ground structure for medical and Satellite communication applications in this work. \textbf{Analysis:} The proposed antenna model is resonating at multiband with the addition of destructive ground structure. Three different iterations are examined in the finalization of the proposed model. \textbf{Method:} All the antenna parameters are analyzed with respect to reflection coefficient, radiation patterns and field distributions. \textbf{Findings:} Ansys HFSS tool is used to model and for the simulation of the results in this work. \textbf{Result:} The measured results for the prototyped antenna model on vector network analyzer are presented for validation purpose along with simulated results.

\textbf{Keywords:} Sierpinski Gasket, Fractal Antenna, Defected Ground Structure, Multiband characteristics

\section*{INTRODUCTION}

Designing a small antenna with good bandwidth performance presents a challenge for modern communications. To minimize the size of the antenna or to improve its characteristics, various solutions based on fractal geometry have recently been proposed. Different fractal geometries such as Peano, Hilbert, Sierpinski curves have been used to bring forth the benefits of small size, wide bandwidth or multiband operation\textsuperscript{1-4}. Fractal curves are unique for their self-similarity and space filling properties. Due to the self-similarity, a fractal antenna being made up of many differently scaled copies of itself is likely to maintain similar radiation parameters in different bands proportional to the wavelengths\textsuperscript{5-6}. On the other hand, space filling property of fractals allows theoretically the design of infinite length lines on finite substrate areas thus leading to compact antennas. In this paper we propose a sierpinski gasket fractal curve of third order with defected ground structure\textsuperscript{7-8}.

The sierpinski gasket is an important sample of fractal set. The construction of many ideal Fractal shapes is usually carried out by applying an infinite number of times an iterative algorithm. In such iterative procedure, an initial structure called generator is replicated many times at different scales, positions and directions, to grow the final Fractal structure\textsuperscript{9-10}. Fractal’s antennas are widely preferred for wireless communication systems as they are of small size, light weight, low profile, low cost, and are easy to fabricate and assemble\textsuperscript{11-12}. Band-notched operation is achieved by inserting a conventional square split ring resonator (SRR) which is magnetically excited via patch placed at the adjacent side of the feed line. The SRR was first introduced as a new method for the design of metamaterial structures. The SRR is a pair of concentric annular rings with splits in them at opposite ends\textsuperscript{13}. The two rings are positioned such that the gap of each ring is placed opposite to the other. This gap strongly controls the resonance frequency\textsuperscript{14}. Three different iterations of triangular patch are compared in terms of their return loss and bandwidths. To validate the simulation results, the proposed antenna was fabricated and measured.

\textbf{Keywords:} Sierpinski Gasket, Fractal Antenna, Defected Ground Structure, Multiband characteristics
RESULTS AND DISCUSSIONS

The simulated and measured results are analyzed and presented in this section. Fig.2. shows the reflection coefficient characteristics of different iterations in the sierpinski antenna. The basic iteration model is resonating at multiband with considerable bandwidth at operating frequencies. The proposed antenna model is resonating at penta band with high bandwidth at upper frequency band. At lower frequency, basic iteration is showing better bandwidth whereas at higher frequency, iteration 2 is showing superior bandwidth results. VSWR of 2:1 ratio is maintained by the antenna models at resonant frequencies and impedance of nearer to 50 ohms.

\[
B = \frac{1}{Q} \sqrt{\frac{S-1}{S}} = \frac{\text{VSWR}-1}{\sqrt{\text{VSWR} \cdot Q}} \quad (1)
\]

Fig.1. Sierpinski Fractal Antenna, with CSRR (Proposed)

The dimensions are \( L_s=60 \), \( W_s=60 \), \( L_p=34.6 \), \( H_p=30 \), \( L_f=15 \), \( W_f=4 \), \( G_p=0.9 \), \( d_1=15.3 \), \( L=60 \), \( L_1=10 \), \( L_2=15 \), \( L_3=25 \), \( W_1=5 \) mm.

Fig.1. Sierpinski Fractal Antenna, with CSRR (Proposed)

Fig 3. 3D Radiation in E and H-plane at 3.1 GHz

Fig.3 shows the current distribution characteristics of the fractal monopole antenna. For the designed antenna model, the current density is focused at the lower part of the radiating element and at upper part of the ground plane at 8.1 GHz. Most of the radiation is coming out of lower half part of the radiating element.

Fig 3. 3D Radiation in E and H-plane at 3.1 GHz
Antenna is showing poor surface current at the top of the triangular patch element and higher at lower part. The electrical length of the proposed antenna model further increased because of the number of slots present in the patch element. The ground plane is supporting to the additional resonant frequency with proper impedance matching.

Fig 4. Surface current distribution at top side and bottom side at 3.1 GHz

Fig 5 shows the unit cell analysis of the antenna results, which witness the permittivity of the antenna. The corresponding resonant frequency selection-based equations on inductance and capacitance is presented.

\[ F_{\text{res}} = \frac{1}{\pi \sqrt{L_{\text{des}} \times C_{\text{des}}}} \quad \cdots \quad [1] \]

\[ C_{\text{des}} = P \times C_{\text{res}} \quad \cdots \quad [2] \]

\[ f_s = \frac{C}{\sqrt{L_{\text{eff}} \times C_{\text{eff}}}} \quad \cdots \quad [3] \]

Fig 5. Permittivity vs frequency of the unit cell,

Fig 5 shows the prototyped antenna model on FR4 substrate measurement results with Anritsu combination analyzer. The measured results on the instrument is providing excellent matching with the simulation results obtained from the electromagnetic tool.

**CONCLUSION**

A Sierpinski gasket meta fractal antenna is designed for medical and satellite communication applications. The proposed antenna is fabricated on FR4 substrate with dimension of 60X60X1.6 mm and the measured results on the Anritsu MS 2037C are in good agreement with the simulation results. The designed antenna is working in penta band covering Wi-Fi, WLAN, X-Band and satellite communication applications. Antenna showing peak realized gain of 5 dB and average efficiency more than 78% in the operating bands. Multiband applications with low cross polarization in radiation makes this model more suitable for applicability in communication systems.

**Source of Funding:** Self

**Ethical Clearance:** Taken from the department chair of Lingayas Institute of Management and Tech and DDC members to publish this work. No Conflict of Interest.

**REFERENCES**


Determinants of Malnutrition in Children Under Five Years in Developing Countries: A Systematic Review

Tasnim Tasnim

STIKES Mandala Waluya Kendari, Southeast Sulawesi, Indonesia

ABSTRACT

Objectives: Malnutrition in children under five years is a serious public health problem in developing countries, particularly in Africa and Asia regions. Child malnutrition has contributed to 54% of deaths among children under five. This systematic review aimed to identify the determinants of malnutrition in children under five years in developing countries.

Method: This study searched several electronic databases, namely Proquest, Scopus, Web of Science, Pubmed, and Medline Ovid. The final search obtained 36 articles and were reviewed.

Results: Malnutrition in children under five years were determined by parental education, drinking water sources, toilet facilities, and income.

Conclusions: Child malnutrition is generated by no single factors, so dealing with child malnutrition will need comprehensive strategies.

Keywords: Malnutrition, Children under five, Determinants, Developing Countries.

INTRODUCTION

Malnutrition among children aged below five years is a serious public health problem in developing countries, particularly in Africa and Asia regions. In 2010, the World Health Organization reported the number of underweight children is about 30 million in Africa and 71 million in Asia. Health inequities in developing countries are caused by unequal distribution in income, power, goods and services. This condition leads to unfairness in accessibility of health care, education and employment. Therefore, children under five in lower socioeconomic positions often have worse nutritional status than those in higher socioeconomic position.

Malnutrition can increase the risk of both morbidity and mortality in children under five years old. About 54% of deaths among children under five years old are caused by malnutrition. Malnutrition in early childhood can also increase impaired psychological and intellectual development. The disturbance in both psychological and intellectual development can lead to low school performance and behavioral disturbance. Furthermore, malnutrition in early childhood is often associated with low individual’s economic productivity that leads to social and economic deprivation. Therefore, developing the effective strategies to overcome child malnutrition is crucial. However, developing the effective strategies will require sufficient evidence as a basis of decision making among health policy makers and practices. This means that understanding the determinants of child malnutrition is essential. Hence, this systematic review aimed to identify determinants of malnutrition in children under five years.

SEARCH METHODS

Search strategy and outcome

Several electronic databases were used to search relevant articles, namely Proquest, Scopus, Web of Science, Pubmed, and Medline Ovid. Search
articles in those databases used various terms such as “Malnutrition”, “Socioeconomic”, “Children under five”. Electronic databases were searched with a combination of all terms and with OR, AND. Searching was limited to the English language, journal articles, and a date of publication between 2006 and 2018. The start date of 2006 was based on the endorsement of the new international child growth standards\(^6\). At that time, there were many studies that investigated the risk factors of childhood malnutrition.

Screening articles was based on inclusion and exclusion criteria. Inclusion criteria included papers that investigated the association between child malnutrition and socioeconomic factors. Papers that investigated socioeconomic status and other determinants of malnutrition, such as dietary intake and morbidity were also included. Furthermore, papers about interventions addressed for improving child health status were included. Papers were excluded if they investigated only nutrient intake patterns without relating to socioeconomic factors. Papers that investigated the risk factors of nutritional status in primary students, adult or elder groups were also excluded. Furthermore, several papers that examined the association between socioeconomic factors and obesity were excluded.

The first screening was done through the titles and abstracts. Then, the final selection was done through full text articles. There were many same articles in different databases during this selection. Thus, further identification was done and the same articles removed. Finally, 36 relevant articles were obtained. The process of selection the articles can be represented as follows.

![Flowchart of article selection process](chart.png)

**REVIEW DESIGN**

A qualitative literature review is used as an approach to this review. The author summarized and categorized data or evidence from every study into themes. The themes were then integrated and criticized without use a statistical theory. A thematic analysis is applied to analyse evidence after Liamputtong 2009, pp.284-286\(^7\). The process of thematic analysis was started with identifying patterns of determinants of child malnutrition. Similar themes were grouped into sub-categories. Then, these sub-categories were integrated into higher order themes. Finally, this review found 4 themes as mentioned in the results.

**RESULTS**

**Household and community socioeconomic factors**

The determinants of malnutrition are defined into two different levels of the extent, namely household and community level. They influence each other to result in malnutrition in children under five years\(^8\). The household wealth index includes a household possession, drinking water sources, toilet facilities, flooring material, income and expenditure variables\(^9\). While, the household social index comprises paternal education and occupation\(^8\).

Household socioeconomic factors are recognised as predictors of child malnutrition. While, the community socioeconomic factors are determinants of individual socioeconomic status through sharing knowledge and imitation behaviours of demand for services and infrastructures\(^10\).

**Parent’s and grandmother’s education**

The effect of mother’s education on child
malnutrition is stronger than father’s and grandmother’s education. Social norms in rural areas include the role of a mother in domestic chores and child-rearing. Thus, mother’s education affects to child nutrition through several pathways. Firstly, educated mothers are more likely to have more knowledge of child nutrition which leads to better child care practices. Educated mothers also tend to provide healthy environments for children. Educated mothers are 6.5 times more likely to provide toilets and have hygienic behaviours than uneducated mothers. Secondly, educated mothers tend to have a higher awareness of utilization of child health care services. This leads children under five to complete immunization and receipt of vitamin A capsule. Complete immunization during infancy and receipt of vitamin A capsules can reduce the risk of infectious diseases which contribute significantly to child malnutrition. Moreover, educated mothers are more likely to have a better chance of getting jobs. Thus, mothers can support family income and increase purchasing power for healthy food for under-five children. In addition, educated mothers tend to have high autonomy over resources. This leads to egalitarian gender norms of children’s nutrition. Also, autonomous mothers tend to utilize antenatal care of breastfeeding counselling. As a result, child and mother’s health status can be increased. In fact, healthier mothers tend to have the ability to adequately breastfeed, and deliver high-birth weights babies.

However, the effect of fathers’ education on child malnutrition is significant when women have low social status and low decision making power in the family. Thus, decision making in the family will be handled by fathers. Furthermore, educated fathers tend to have educated wives and earn more money. Educated wives are more likely to have better knowledge about child care practices. Earning more money increases purchasing power for healthy food and provides a better environment for children.

Furthermore, Globalization has contributed to an increased number of working mothers in developing countries, particularly in urban areas. Working mothers in urban areas generally give responsibility for grandmothers to look after their children. Therefore, grandmothers play important roles in determinants of child nutritional status. Uneducated grandmothers are more likely to feed differently between young boys and girls. Young girls tend to have slightly more food than boys. This leads higher prevalence of malnutrition in young boys than girls. The risk factor of young boys in uneducated grandmothers is 0.64 times more likely to be stunted and 0.54 times more likely to be underweight.

**Household Income**

Household income contributes to malnutrition in children under-five. It affects purchasing power for food, utilization of child health services and physical capital of improving hygiene standards. Providing appropriate food, such as animal source of food is essential for child growth. Thus, low income cannot meet those aspects. In fact, children in lower income families are 1.49 times more likely to be stunted than those in higher income families. Poor families also tend to spend less money on health services, so mothers have poor knowledge of child feeding practices and children have incomplete immunization and lack of vitamin A. Furthermore, low income families cannot provide better quality of housing, including inadequate clean water and appropriate sanitation facilities. This condition also increases prevalence of infectious diseases in children under five years old.

**Water and sanitation facilities**

Diarrhea is the biggest contribution to malnutrition in under-five children and leads to deaths. The main cause of diarrhea is unhygienic behavior in food preparation and feeding practices. This is generated by inadequate access to clean water and proper sanitation facilities. The effect of diarrhea on childhood is reduced body immunity. Thus, diarrhea will also lead to other infectious diseases and leading to malnutrition. Contaminated water resources have increased parasitic infections. Furthermore, inadequate sanitation facilities, such as toilets and garbage bins contribute to increase contaminated food and drinking water. In fact, children living in a house without a toilet are about 1.61 times more likely to be underweight and 2.7 times more risk of stunting.

**DISCUSSION**

The effect of socioeconomic factors on health is consistent in numerous countries for long periods of time in relation to age, gender or other demographic factors. This review also finds significant contribution of socioeconomic factors to malnutrition in children below five years of age. Under-five children with poor
facilities at home, low income and uneducated families have worse nutritional status than those with adequate facilities at home, rich and educated families. Low socioeconomic factors significantly influence child growth during the second year of life. During this period, children require sufficient healthy supplemental food, supportive environment, complete immunization and adequate vitamin A. Thus, the roles of parents, communities and governments become very important to meet these aspects. Formal educational attainment for parents becomes essential to support their roles in increasing child growth. Formal education is the way to obtain a better job and high knowledge of social sciences, including health knowledge. This condition will lead to improving and increasing child food intakes and living conditions. Better knowledge will also generate awareness to better utilize child healthcare services. Eventually, this phenomenon will reduce infectious diseases and increase child nutritional status.

On the other hand, the community plays a crucial role in sharing knowledge and creating demand of utilization public services and developing infrastructures. Thus, increasing socioeconomic factors is essential at the community level rather than the household level. Improving socioeconomic factors at the community level will affect household socioeconomic status. Increasing household socioeconomic status will then increase living conditions, food availability, behavioural and psychological factors. Ultimately, this condition will lead to health equity and well-being. This review also identifies several crucial issues in relation to socioeconomic factors that contribute to child malnutrition. Firstly, there is inequality in educational attainment between men and women, particularly in rural or remote areas. This leads to high prevalence of malnutrition in these areas. The socio-cultural norms and isolated areas result in gender inequality in education. Therefore, several studies suggest the promoting of gender-balanced formal education to overcome educational inequalities. This strategy gives more benefits to increase women’s educational status and to improve a household economic structure and child nutritional status. Gender equality, eventually, can lead to increasing mother and child health status at the community and country level. Another crucial issue is infectious diseases, including diarrhoea and malaria which contribute to malnutrition in children under five years. The diseases are caused by the quality and accessibility to water and sanitation facilities.

**CONCLUSION**

Household socioeconomic factors are recognised as predictors of child malnutrition, including uneducated parents, household income and water and sanitation facilities in the home. This literature review focus on knowledge of other basic determinants of child malnutrition, such as socio-cultural and political factors. Thus, this review is only suitable as the basis of the study or developing health policies and practices that have strong issues of socioeconomic factors in relation to child malnutrition

**Conflict of Interest:** The author has no conflict of interest associated with the material presented in this paper.

**Source of Funding:** This study was supported by Mandala Waluya Kendari Foundation.

**ORCID**

Tasnim Tasnim http://orcid.org/0000-0002-5322-082X

**REFERENCES**


28. Abuya BA, Onsomu EO, Kimani JK, Moore D. Influence of maternal education on child


ABSTRACT

Objective: This study aims to determine the effect of lead exposure on MDA levels as an indicator of the risk of oxidative stress associated with damage to cell membranes, DNA, RNA, and brain cells at gas station officers in Sleman. Method: This research is an observational analytic study with quantitative research and using Cross-Sectional design on 43 workers of gas station that selected by inclusion and exclusion criteria in 3 places located in Sleman.

Results: The average blood lead level on subjects are 62.174 μg/L with standard deviation 23.602. The lowest lead level is 16.707 μg/L and the highest is 118.503 μg/L. Average levels of MDA is 5.869 μg/L with standard deviation 1.232. The lowest levels of MDA is 3.53 μg/L and the highest is 7.97 μg/L. Pearson correlation test results showed that there is a highly significant correlation between blood lead levels and Malondialdehyde levels (p = 0.0000) (r = 0.8432). The multivariate analysis showed that the blood lead level was significant predictor (p<0,05) toward MDA levels with effective contribution of 69.6%. The linear regression equation is “MDA = 3.1605 + 0.000043 * lead levels”. The equation can be used to predict the value of MDA levels taking into account the levels of lead, for example blood lead level of 10.000 μg/L then MDA levels predicted of 3.590 μmole/L. In this pathway, Aminolevulinic Acid Dehydratase (ALAD) enzyme is one of most vulnerable to lead toxicity. Inhibition of δ-ALAD by lead will cause high levels of Aminolevulinic Acid (ALA) in the blood. High levels of ALA in blood will increase production of ROS.

Conclusions: Blood lead levels and malondialdehyde levels in employee of gas station (SPBU) has exceeded the normal limit which average blood lead level are 62.174μg/L and the levels of MDA are 5.86 μmole/LA.

Keywords: lead, malondialdehyde, oxidative stress

INTRODUCTION

The development of the industrial world today has an impact on air pollution in big cities. The transportation industry in particular increases the number of diode motor vehicles getting higher. The burning of gasoline in motor vehicles is more than half the cause of urban air pollution. Air pollution due to reciprocity of vehicle emissions gas has become one of the world’s problems, especially in Asia, Africa and Latin America that still uses lead in its vehicle fuel. In Indonesia 85% of air pollution in the market comes from motor vehicle emissions. Motor-fueled vehicles, low-quality fuel usage and under-cared care conditions. Air pollution from motor vehicle emissions is very influential on the level of lead in the blood of a person who is high activity on the streets. Working groups at high risk of exposure to airborne lead pollutants such as traffic cops, street vendors, beggars, and Fuel Supply Station workers.

The organic lead Tetra Ethyl Lead (TEL) and Tetra Methyl Lead (TML) are additives added to the gasoline to increase the octane number in the fuel. In the process
of burning the engine, lead in gasoline does not react so that after burning about 25% of lead (Pb) remains in the engine and the other 75% will contaminate the air as exhaust gases. The lead metals (Pb) that people inhaled every day will accumulate in the body. In the human body, lead is a powerful oxidant. Exposure to lead pollution in low doses even though it can cause disruption in the body without showing clinical symptoms. Chronic lead exposure will lead to negative health impacts such as the reproductive system, the nervous system and intelligence, the gastrointestinal systemic effects, the cardiovascular system, and the kidneys4.

This study measures lead levels in workers of the Fuel Supply Station (SPBU) as one of the high risk groups for direct exposure to lead. Exposure to lead can come from emissions of incoming vehicles and steam coming from gasoline at the time of filling5. The content of lead in the body can be detected through blood, hair and urine. Several studies have reported lead levels in SPBU workers, one of which is Tayrab’s research6, comparing the lead level in the blood of 50 SPBU officers with 42 control groups. The result of the lead level in the blood of SPBU officers averaged 10.5μg/dl higher than the control group 5.0 μg/dl. In line with Rosyidah’s research7, describes the relationship of blood lead levels with the incidence of hypertension. The result is an average lead level in the blood of SPBU officers 24.97 μg/dl and there is a significant relationship with the incidence of hypertension. Research Laila to determine the level of lead in blood and health complaints at female gas station attendants shows high levels of lead in the blood and the emergence of various health complaints such as nausea, fatigue, difficulty breathing, and bleeding gums. This is true indicating that SPBU officers are groups that have a high risk of exposure to lead and the occurrence of health problems due to exposure4.

Malondialdehyde (MDA) is often used in many laboratories as an indicator to determine the extent of damage caused by oxidative stress. Malondialdehyde is one of the major aldehydes derived from the reactive three-carbon lipid peroxidation in the cell membrane and forms a complex bond with other elements in the tissue. The higher the oxidative stress occurring within the body cells gives the same effect as the MDA value increases. Malondialdehyde (MDA) is a good indicator of the rate of lipid peroxidation as it is produced constantly according to the proportion of lipid peroxidation formed8,9. Polat Research compared the MDA levels in the blood of 24 workers in the manufacture of metal shelves indicated exposure to heavy metals (nickel, iron, mercury) during its work with 17 people from outside the plant as controls. The result was that the MDA level in the blood of the workers was averaged 0.28nmol/ml higher than the control group 0.16nmol/ml10. Based on data from the office of Samsat Sleman in Hubbakinfo Service (2012) the number of vehicles in Sleman Regency continues to rise where in 2009 there were 429,201 with a 5% increase from the previous year and in 2010 there were 455,362 with a percentage increase of 6%. The number of vehicles that continue to rise each year will be followed by increasing public fuel services, in line with it will increase air pollution which one of them is lead11.

MATERIAL AND METHOD

Research Type: This research is an observational analytic research with quantitative research method and using approach / design of Cross-Sectional research (cut-latitude). Observation of factors and outcomes performed along with the confounding variable as an ongoing action. Conduct research with survey methods and laboratory costs.

Research Material: The materials in this research consist of primary and secondary data. Primary data were obtained from research subjects and laboratory results. Primary data collected from the results of plasma malondilidehyde examination conducted at UGM PAU Laboratory using TBRs method and blood level examination conducted in the laboratory.

Secondary data were collected from bibliography with bibliographic studies ie books, articles and other references related to variables in the study.

Research Subject and Location

The location of the research was conducted at 3 (three) Public Filling Stations in Sleman, Yogyakarta is Magelang Station, Adi Sucipto Station and Monument Jogja Station.

The subjects of the study were SPBU officers consisting of 3 (three) public refueling stations totaling 43 workers meeting the criteria:

Inclusion: Willing to be a research sample; Age 17 - 45 years; Work period > 1 year; Active works last 2
months.

Exclusion: Has a chronic disease based on anamnena questionnaires such as heart disease, pulmonary tuberculosis, chronic liver, Diabetes Mellitus; Taking drugs.

RESULTS

Table 1. Characteristics of research subjects based on age, sex, smoking habit of drinking alcoholic beverage officer at gas stations Jln. Monjali, gas station Jln. Magelang, SPBU Jln. Adjisucipto

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>Amount (n = 43)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 -25 years</td>
<td>14</td>
<td>32,56</td>
</tr>
<tr>
<td>26-30 years</td>
<td>15</td>
<td>34,88</td>
</tr>
<tr>
<td>31-35 years</td>
<td>5</td>
<td>11,63</td>
</tr>
<tr>
<td>36-40 years</td>
<td>5</td>
<td>11,63</td>
</tr>
<tr>
<td>41-45 years</td>
<td>4</td>
<td>9,30</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>35</td>
<td>81,4</td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
<td>18,6</td>
</tr>
<tr>
<td>Smoking Habit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>46,51%</td>
</tr>
<tr>
<td>No</td>
<td>23</td>
<td>53,49%</td>
</tr>
<tr>
<td>Drinking Alcohol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No</td>
<td>43</td>
<td>100%</td>
</tr>
</tbody>
</table>

The table above shows that the characteristics of research subjects aged 20-45 years, the number of most aged 26-30 years is 15 people (34.88%) while the number of the least 41-45 years old is 4 people (9.30%). Based on sex shows most of the subjects were men as many as 35 people (81.4%) and women only 8 people (18.6%).

Table 2. Characteristics based on Body Time Index (BMI), Work Period and Use of Personal Protective Equipment (APD) officer at SPBU Jln. Monjali, gas station Jln. Magelang, SPBU Jln. Adjisucipto

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Amount n = 43</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>IMT</td>
<td></td>
</tr>
<tr>
<td>Thin</td>
<td>8</td>
</tr>
<tr>
<td>Normal</td>
<td>29</td>
</tr>
<tr>
<td>Fat</td>
<td>6</td>
</tr>
<tr>
<td>Years of service</td>
<td></td>
</tr>
<tr>
<td>1-5 Years</td>
<td>18</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>10</td>
</tr>
<tr>
<td>11-15 Years</td>
<td>9</td>
</tr>
<tr>
<td>16-20 Years</td>
<td>6</td>
</tr>
<tr>
<td>Use of PPE</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
</tr>
<tr>
<td>No</td>
<td>34</td>
</tr>
</tbody>
</table>

Based on the category of body mass index (IMT), most of the subjects of normal BMI study were 29 people (67.44%) while as many as 8 people (18.6%) with skinny category, and 6 people (13.95%) fat category.

Characteristics of working period, most subjects have worked 1 - 5 years as many as 18 people (41.86%) and at least 6 people have worked 15 - 20 years. Research subjects who routinely use PPE as much as 9 people (13.95%) while as many as 34 people (79.7%) never use PPE.
Table 3. Results of linear regression analysis.

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable Coefficient</th>
<th>Malondialdehid</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SE</td>
<td>T</td>
</tr>
<tr>
<td>Step 1</td>
<td>Lead Level</td>
<td>0.000046</td>
<td>6.59e-06</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>0.000046</td>
<td>0.0340</td>
</tr>
<tr>
<td></td>
<td>Years of service</td>
<td>-0.0375</td>
<td>0.0421</td>
</tr>
<tr>
<td></td>
<td>Constanta</td>
<td>1.7963</td>
<td>0.9475</td>
</tr>
<tr>
<td>Step 2</td>
<td>Lead Level</td>
<td>0.000044</td>
<td>6.13e-06</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>0.0126</td>
<td>0.0204</td>
</tr>
<tr>
<td></td>
<td>Constanta</td>
<td>2.3106</td>
<td>0.7498</td>
</tr>
<tr>
<td>Step 3</td>
<td>Lead Level</td>
<td>0.000043</td>
<td>4.50e-06</td>
</tr>
<tr>
<td></td>
<td>Constanta</td>
<td>3.1605</td>
<td>0.2987</td>
</tr>
</tbody>
</table>

*R^2 = 0.696

Based on the results of linear regression analysis, step 1 - 3 above the p value of the age variable, and the working period is greater than 0.05 so it must be eliminated. Result of regression test of linear, variable related with malondialdehid content is lead level in blood (Step 3), Regression equation obtained are: Levels MDA = 3,1605 + 0.000043 * Lead Level

Equations that can be used to predict MDA levels by considering lead levels, such as a 10,000 μg/L lead level of a person, the MDA level is predicted to be 3.590μmol/L.

The data above the value of R2 = 0.696, This value means that the level of coordination of 69.6% against malondialdehid levels. There are still other factors affecting MDA levels of 30.4% such as antioxidants, other metals derived from fuels and pollutant gases from the rest of the burning of motor vehicles. This study only discusses the level of MDA of SPBU officers including groups of workers with high awareness of lead exposure2.

DISCUSSION

The results showed that the mean blood lead level in the subjects was 62,174 μg/L with the lowest level of 16,707 μg/L with the highest level of 118,503. Research subjects who have lead levels <30 μg/L as many as 4 people the rest 39 people lead levels have exceeded the normal limit. Based on ACGHI criteria of normal lead levels if <30 μg/L.12

Lead in the body affects the heme synthesis pathway, by inhibiting heme, hemoglobin synthesis, altering the morphology of red blood cells and affecting the survival of red blood cells. In the path of heme synthesis, the enzyme Aminolevulinic acid dehydratase (ALAD) is one of the enzymes most susceptible to toxic effects of lead. Several studies have shown that even low levels of lead (about 15 μg/L) can inhibit ALAD enzyme activity. Lead that inhibits the action of ALAD enzymes in addition to decreasing the activity of hemoglobin synthesis will cause high levels of ALA in the blood. High levels of ALA in the blood will increase the production of ROS. Increased production of ROS and its reactive properties will cause lipid, protein or DNA oxidation13,14. One of the products formed from lipid oxidation is lipid peroxidation (ROOH). Unstable lipid peroxidation easily decomposes to form various compounds such as epoxides, hydrocarbons and aldehydes. Malondialdehyde is the result of lipid peroxidation of aldehyde group, high MDA level describes the cell membrane oxidation process. Normal MDA values are 0.83 - 1.01 μmol/L.14

This study focuses on the effect of exposure to free radicals from outside the body, especially heavy metals, which lead to the risk of oxidative stress measured by measurement of MDA levels as oxidative stress biomarkers. The influence of other exposures
that also come from outside such as smoking, alcohol consumption, BMI, the working period, and the use of PPE is also illustrated through questionnaires in this study to determine the presence or absence of influence on MDA levels. Exposure to free radicals from outside such as age and years of service based on the results of this study indicate an influence on MDA levels, but the effect is not stronger than lead levels based on statistical tests. The period of work in this study is associated with the accumulation of lead exposure, so the longer the working period the higher the exposure of lead. This explains the indirect relationship between the amount of lead exposure to increased MDA levels16,18.

CONCLUSIONS

Blood lead levels and malondialdehyde levels in employee of gas station (SPBU) has exceeded the normal limit which average blood lead level are 62,174 μg/L and the levels of MDA are 5.86 μmole/LA.

Conflicts of Interest: Authors declare that no any conflict of interest on this research and publication including on funding.

Ethical Clearance: Taken from University committee.

Source of Funding: The funding source in this research came from College of Health Sciences Mandala Waluya, Kendari.

REFERENCES

16. Hasmi and Anwar Mallongi, 2016., Health Risk
Analysis of Lead Exposure from Fish Consumption among Communities along Youtefa Gulf, Jayapura. Pakistan Journal of Nutrition Volume 15, Number 10, 929-935.


Analysis Chemical Compound of Pokea (*Batissa Violacea Celebensis Martens 1897*) The Origin of Konawe Regency Southeast Sulawesi

Sri Anggarini Rasyid¹, Maria Bintang², Bambang P Priosoeryanto³, Ratna Umi Nurlila⁴, Ridwan Adi Surya⁵

¹D-IV Health Analyst Study Program, Mandala Waluya Health Science College, Jl. Jenderal A.H. Nasution No. G-37 Kendari Southeast Sulawesi Province, Indonesia, ²Department of Biochemistry, Bogor Agricultural University, Campus Dramaga Bogor, ³Department of Veterinary Clinic, Reproduction & Pathology, Faculty of Veterinary Medicine, Bogor Agricultural University, IPB Campus Dramaga Bogor 16680, ⁴D-IV Health Analyst Study Program, Mandala Waluya Health Science College, ⁵Department of Environmental Science, Halu Oleo University Kendari

ABSTRACT

The aim of this study was to processing, and analyzing the results of extraction of chemical compounds to fresh, boiled and dried pokea shell that can be applied in analyzing antioxidant activity and testing cytotoxic activity. This study consists of Extracting the components in the shell according to the polarity level so that the unknown bioactive component can be extracted optimally on one of the solvents used, performing analysis of rendemen, to know the percentage of body parts of pokea shells that can be used, conducting proximate analysis, to determine the water content, ash content, fat content, and protein content. The results of proximate composition analysis show that pokea shell can be classified as high protein of fishery product, low fat, rendemen of pokea shell meat is average 27.8%. The result of t-test analysis to the essential amino acid content of fresh and boiled pokea meat, only lysin is significantly different. While the content of non-essential amino acids, glutamic acid, serine, glycine, and cysteine are significantly different. The amount of total amino acids in pokea shell meat is relatively similar after boiling, while the total of non-essential amino acid has a significant decrease of 29.43%, In fresh and boiled pokea shell meat identified 25 types of fatty acids. The content of fatty acids in pokea shells after boiling is relatively stable, Based on the ratio of n6 / n3 and PUFA/SFA ratio of fresh, boiled and dried pokea shell, it can be said to be healthy and safe to consume, Based on the result of the identification that extract is true because it is proven giving positive reaction result which containing protein and carbohydrate.

Keywords: Pokea shells, bioactive component, glycoprotein, amino acids

INTRODUCTION

Pokea (*Batissa violacea celebensis Marten 1897*) is a type of bivalve from the Corbiculidae Family from the Pohara River of Konawe Regency, Southeast Sulawesi². Utilization of pokea shell by the local community is generally done by boiling. Water stew of pokea shell that has never been used, it actually contains glycoprotein compounds that can act as immunomodulatory agents or as antitumor. The content of glycoprotein in shell meat is estimated to be about 0.5% so it is not possible for us to get the glycoprotein from the shell directly².

Pokea shells are empirically believed to treat various diseases such as jaundice, malaria, asthma, lowering blood pressure and fever. The disease occurs due to infection by foreign materials and microorganisms. When the body is infected with microorganisms, the body responds with macrophage and neutrophil activity mechanisms. In this case the oxidase and oxygenase
enzymes will form various free radical compounds and reactive oxygen compounds, including hypochlorid acid (HOCl) that will attack and destroy viruses and bacteria. Radical compounds are also very dangerous because of the potential to attack the body’s cells. If this is not controlled, it will trigger the emergence of various chronic diseases.

**MATERIAL AND METHOD**

**Sampling and sample preparation**

The multi-storey extraction of pokea shells (Quinn method is referred to in Darusman et al.4 Rendement Hustiany5 and Proximate Analysis AOAC6

Glycoprotein extraction Sasaki et al.7 Method with slight modification)

The identification of glycoproteins was performed by color reactions using biochemical reagents for the protein test and Molisch reagent for carbohydrate test. Based on the results of the identification can be concluded that the extract is true glikoprotein because it is proven to give positive reaction results contain protein and carbohydrates.

Analysis of glycoprotein content was performed on the shell meat with two different treatments to determine the effect of boiling duration on glycoprotein content in shell meat. Result of analysis of glycoprotein content for each species of shell with boiling duration 30, and 60 minutes

5. Analysis of amino acids AOAC8

(a) Stage of making protein hydrolyzate
(b) Stage of drying
(c) Stage of derivatization
(d) Injection to HPLC

6. Taurine analysis8

7. Fatty acid analysis
(a) Sample preparation (hydrolysis and esterification)
(b) Analysis of fatty acid components as FAME

8. Cholesterol analysis

9. Vitamin analysis9
(a) Vitamin A, D, dan E
(b) Vitamin B12

**RESULTS AND DISCUSSION**

**Rendemen of pokea shell meat**

Rendemen is the percentage between the weights of a portion which can be utilized compared to the weight of the whole material. The part commonly used by the community as food is the meat. Based on the result of the measurement of pokea shell meat is average 27,8%

**Proximate analysis**

The results of proximate analysis on pokea shell meat include protein, fat, ash, and water. The proximate composition of fresh, boiled, and dried pokea shell can be seen in Table

**Table 1. Proximate composition (% w / w dried weight) of fresh, boiled, and dried pokea shells**

<table>
<thead>
<tr>
<th>Proximate Composition</th>
<th>Fresh</th>
<th>Boiled</th>
<th>Dried</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
<td>85.3279%</td>
<td>71.9222%</td>
<td>32.8539%</td>
</tr>
<tr>
<td><strong>Ash</strong></td>
<td>0.7637%</td>
<td>1.2430%</td>
<td>3.4967%</td>
</tr>
<tr>
<td><strong>Fat</strong></td>
<td>1.0039%</td>
<td>2.7752%</td>
<td>12.367%</td>
</tr>
<tr>
<td><strong>Protein</strong></td>
<td>9.9722%</td>
<td>19.2262</td>
<td>61.9343%</td>
</tr>
</tbody>
</table>

Table 1 shows that after the boiling process, the proximate value of pokea shell meat has decreased with fresh pokea shell meat. Tapotubun et al.10 reported that temperature and heating time had an effect on the fat content of the product. This is closely related to the fat characteristic that are solid at room temperature while the temperature achieved at the boiling process is 100°C so that the fat will melt in the cooking water. Similarly, the carbohydrate contents decreased after boiling. This is thought to be due to the dissolution of glycogen during boiling. Winarno11 explains that carbohydrates in animals consist of water-soluble glycogen.
The results of this proximate composition analysis show that pokea shell can be classified as high protein of fishery product (more than 50%), low fat (below 5%). Primadhani\textsuperscript{12} reported that foods that contain high protein, low fat, and high carbohydrate are good consumed by people with liver disease. This proves that the pokea shells are empirically and scientifically able to treat liver disease.

Mineral

The content of heavy metals in dried pokea shell meat has been reported. The concentration of heavy metal in dried pokea shell was still below the limit of AAS detection device used was Pb <0.01 ppm; Cd <0.001 ppm; and Hg <0.0002 ppm. According to BPOM RI (2009) and SNI 7387 (2009), that maximum Pb in food is 1.5 ppm; Cd = 1.0 ppm;

Amino Acids

The essential amino acid type of fresh and boiled pokea shell meat is dominated by lysin, arginine, and valine from the amount of essential amino acids. In dried pokea shell meat is dominated by valine, lysin, and arginine the amount of essential amino acids while non-essential amino acids in fresh and boiled pokea shell meat are each dominated by aspartic acid and glutamate from the amount of non-essential amino acids. The result of t-test analysis to the essential amino acid content of fresh and boiled pokea meat, only lysin is significantly different. While the content of non-essential amino acids, glutamic acid, serine, glycine, and cysteine are significantly different. The amount of total amino acids in pokea shell meat is relatively similar after boiling, while the total of non-essential amino acid has a significant decrease of 29.43%. This is suspected because amino acids can dissolve in boiling water. Lochs et al\textsuperscript{13} reported that amino groups in free amino acids are not in a bonded form so easily soluble or lost in water.

Table 2. Total Amino Acid content (% w / w dried weight) fresh, boiled and dried pokea shell

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Fresh</th>
<th>Boiled</th>
<th>Dried</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential Amino Acids</td>
<td>0.10</td>
<td>0.27</td>
<td>0.78</td>
</tr>
<tr>
<td>Histidine</td>
<td>0.27</td>
<td>0.73</td>
<td>2.15</td>
</tr>
<tr>
<td>Threonin</td>
<td>0.43</td>
<td>1.26</td>
<td>3.45</td>
</tr>
<tr>
<td>Arginine</td>
<td>0.12</td>
<td>0.38</td>
<td>1.02</td>
</tr>
<tr>
<td>Methionin</td>
<td>0.31</td>
<td>0.78</td>
<td>2.43</td>
</tr>
<tr>
<td>Valin</td>
<td>0.21</td>
<td>0.53</td>
<td>1.72</td>
</tr>
<tr>
<td>Phenylalanine</td>
<td>0.29</td>
<td>0.74</td>
<td>2.15</td>
</tr>
<tr>
<td>I-Leucine</td>
<td>0.40</td>
<td>1.13</td>
<td>3.01</td>
</tr>
<tr>
<td>Leucyne</td>
<td>0.31</td>
<td>0.80</td>
<td>2.66</td>
</tr>
<tr>
<td>Lysine-E</td>
<td>0.78</td>
<td>2.15</td>
<td>3.45</td>
</tr>
<tr>
<td>Non-Essential Amino Acids</td>
<td>0.80</td>
<td>2.23</td>
<td>5.78</td>
</tr>
<tr>
<td>Glutamate acid</td>
<td>0.56</td>
<td>1.51</td>
<td>4.17</td>
</tr>
<tr>
<td>Aspartate acid</td>
<td>0.23</td>
<td>0.62</td>
<td>2.05</td>
</tr>
<tr>
<td>Serine</td>
<td>0.30</td>
<td>0.62</td>
<td>1.83</td>
</tr>
<tr>
<td>Glycine</td>
<td>0.32</td>
<td>0.87</td>
<td>2.53</td>
</tr>
<tr>
<td>Alanine</td>
<td>0.18</td>
<td>0.53</td>
<td>1.57</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>4.84</td>
<td>13.01</td>
<td>37.29</td>
</tr>
<tr>
<td>Total Amino Acids</td>
<td>14.36</td>
<td>18.91</td>
<td>37.29</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>5.78</td>
<td>4.17</td>
<td>3.45</td>
</tr>
</tbody>
</table>

Taurine

Although the mechanism of action is poorly understood, taurine has important effect to cardiovascular and affects platelet agglomeration, neuromodulation of central nervous system (CNS), retinal photoreceptor activity, endocrine function, antioxidant activity, and growth control and differentiation cell\textsuperscript{14}. 
Taurine has several benefits: preventing diabetes, preventing liver damage due to alcohol, and healing to vision problems. Taurine can also lower blood cholesterol contents, normalize blood pressure, and fight liver disease. This is because taurine is a component of glutathione, the protector of the brain and the liver from drug damage or toxins, alcohol, and other elements that can harm the body. Taurine also plays a role in digesting fat, absorbing fat soluble vitamins, regulating cholesterol contents in which taurine conjugates with bile acids that have a significant impact on solubility and excretion of cholesterol, and prevents plaque buildup along the arteries.

The result of taurine analysis on fresh, boiled, and dried pokea shell meat is not detected because it is below the limit of detection rate of 0.69, because it is a free amino acid that is easily soluble in water. Ueki and Stipanuk reported that taurine is a free amino acid that can be synthesized by the body.

**Fatty Acid**

**Composition of Saturated Fatty Acid (SFA), Monounsaturated Fatty Acid (MUFA), and Polyunsaturated Fatty Acid (PUFA)**

Fatty acids are organic acids contained as triglyceride ester or good fats derived from animals or plants. The types of fatty acids present in fresh, boiled, and dried pokea shell can be seen in Table 3.

In fresh and boiled pokea shell meat identified 25 types of fatty acids. The content of fatty acids in pokea shells after boiling is relatively stable. According to Winarno, fatty acids with C atoms more than twelve are not soluble in cold or hot water.

The total content of MUFA and PUFA of fresh or boiled pokea seafood is higher than that of its SFA composition. Simopoulos reported that MUFA and PUFA play an important role in reducing cardiovascular disease, type 2 of diabetes, inflammatory diseases, and autoimmune disorders. This is because there is a possibility of fatty acids suppressing inflammation by inhibiting leucotriene biosynthesis pathways namely unsaturated fatty acids containing carbon released during inflammatory processes and other pro-inflammatory eikosanoid.

---

**Table 3. Fatty acid composition (% w / w in fat) fresh, boiled and dried pokea shell meat.**

<table>
<thead>
<tr>
<th>Types of Fatty Acids</th>
<th>Fresh</th>
<th>Boiled</th>
<th>Dried</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SFA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lauric Acid, C12:0</td>
<td>0,03</td>
<td>0,03</td>
<td>0,02</td>
</tr>
<tr>
<td>Miristat Acid, C14:0</td>
<td>2,92</td>
<td>2,28</td>
<td>2,31</td>
</tr>
<tr>
<td>Pentadecanoid Acid, C15:0</td>
<td>0,43</td>
<td>0,37</td>
<td>0,47</td>
</tr>
<tr>
<td>Palmitat Acid, C16:0</td>
<td>12,91</td>
<td>11,79</td>
<td>11,12</td>
</tr>
<tr>
<td>Heptadecanoic Acid, C17:0</td>
<td>1,82</td>
<td>1,88</td>
<td>1,69</td>
</tr>
<tr>
<td>Stearat Acid, C18:0</td>
<td>3,17</td>
<td>3,30</td>
<td>2,93</td>
</tr>
<tr>
<td>Arachidic Acid, C20:0</td>
<td>0,86</td>
<td>0,94</td>
<td>0,89</td>
</tr>
<tr>
<td>Henecicosanoic Acid, C21:0</td>
<td>0,28</td>
<td>0,28</td>
<td>0,27</td>
</tr>
<tr>
<td>Behenic Acid, C22:0</td>
<td>0,22</td>
<td>0,24</td>
<td>0,25</td>
</tr>
<tr>
<td>Tricosanoid Acid, C23:0</td>
<td>0,08</td>
<td>0,09</td>
<td>0,09</td>
</tr>
<tr>
<td>Lignoceric Acid, C24:0</td>
<td>0,08</td>
<td>0,03</td>
<td>0,08</td>
</tr>
<tr>
<td><strong>Total SFA</strong></td>
<td>22,8</td>
<td>21,23</td>
<td>20,12</td>
</tr>
<tr>
<td><strong>MUFA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acid Myristoleic, C14:1</td>
<td>0,03</td>
<td>0,03</td>
<td>0,04</td>
</tr>
<tr>
<td>Palmitoleat Acid, C16:1</td>
<td>6,29</td>
<td>5,52</td>
<td>5,43</td>
</tr>
<tr>
<td>Cis-10-Heptadecanoic Acid, C20:1</td>
<td>0,24</td>
<td>0,22</td>
<td>0,21</td>
</tr>
<tr>
<td>Elaidic Acid, C18:1n9t</td>
<td>0,17</td>
<td>0,15</td>
<td>0,15</td>
</tr>
<tr>
<td>Oleic Acid, C18:1n9c</td>
<td>3,47</td>
<td>3,43</td>
<td>3,08</td>
</tr>
<tr>
<td>Cis-11- Eicosenoic Acid, C20:1</td>
<td>0,28</td>
<td>0,31</td>
<td>0,26</td>
</tr>
</tbody>
</table>
Table 3. Fatty acid composition (% w/w in fat) fresh, boiled and dried pokea shell meat.

<table>
<thead>
<tr>
<th>Total MUFA</th>
<th>10.48</th>
<th>9.51</th>
<th>9.17</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUFA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linoleat Acid, C18:2n6c</td>
<td>1.95</td>
<td>1.90</td>
<td>1.68</td>
</tr>
<tr>
<td>v- Linolenic Acid, C18:3n6</td>
<td>0.17</td>
<td>0.14</td>
<td>0.13</td>
</tr>
<tr>
<td>Linolenic Acid, C18:3n3</td>
<td>1.60</td>
<td>1.54</td>
<td>1.36</td>
</tr>
<tr>
<td>Cis-11,14- Eicosedienoic Acid, C20:2</td>
<td>0.41</td>
<td>0.42</td>
<td>0.38</td>
</tr>
<tr>
<td>Cis-8,11,14- Eicosatrienoic Acid, C20:3n6</td>
<td>0.14</td>
<td>0.16</td>
<td>0.15</td>
</tr>
<tr>
<td>Arachidonic Acid, C20:4n6</td>
<td>2.28</td>
<td>2.62</td>
<td>2.25</td>
</tr>
<tr>
<td>Cis-5,8,11,14,17-Eicosapentaenoic Acid (EPA), C20:5n3</td>
<td>0.97</td>
<td>0.08</td>
<td>0.86</td>
</tr>
<tr>
<td>Cis-4,7,10,13,16,19-Asam Docosahexaenoic (DHA), C22:6n3</td>
<td>0.91</td>
<td>1.02</td>
<td>0.80</td>
</tr>
<tr>
<td>Total PUFA</td>
<td>6.83</td>
<td>7.88</td>
<td>6.25</td>
</tr>
<tr>
<td>PUFA/SFA</td>
<td>0.35</td>
<td>0.37</td>
<td>0.31</td>
</tr>
<tr>
<td>n3</td>
<td>3.48</td>
<td>2.64</td>
<td>3.02</td>
</tr>
<tr>
<td>n6</td>
<td>2.59</td>
<td>2.92</td>
<td>2.53</td>
</tr>
<tr>
<td>n6/n3</td>
<td>0.74</td>
<td>1.11</td>
<td>0.84</td>
</tr>
<tr>
<td>Total of Fatty Acid</td>
<td>41.71</td>
<td>39.71</td>
<td>36.92</td>
</tr>
</tbody>
</table>

The content of Eikosapentaenoate (EPA) and Dokosaheksaenoat (DHA)

The EPA content of fresh, boiled and dried pokea shell meat was 0.97 mg / 100 g 0.08 mg/100g and 0.86 mg / 100 g; while the DHA content of each is 0.91 mg / 100 g, 1.02 mg / 100 g and 0.80 mg / 100 g. The content of EPA and DHA of these pokea shells is still higher than that of some freshwater fish species. The content of EPA and DHA on pokea shell meat after boiling is relatively the same. PUFA-n3 in pokea shell meat was fresh (3.48%), boiled (2.64%) and dried (3.02%). While PUFA-n6 in pokea shell meat was fresh (2.59%), boiled (2.92%) and dried (2.53%).

**Cholesterol**

Analysis of cholesterol content on fresh and boiled pokea shell meat relatively the same. The cholesterol content of pokea shell meat is lower than the yolk cholesterol content of 1,030 mg / 100 g.

**Vitamin**

Vitamin A and D content in each treatment of pokea shell sample did not meet the limit of detection limit. This means that the vitamin A and D content of each sample of the pokea shell is very small less than the limit of device detection limit. Morris et al. (2004) reported that the nutrient content of a foodstuff may be damaged or lost during processing due to its sensitivity to heat, light, oxygen, pH of the solution, and a combination of several factors.

**CONCLUSION**

Based on the result of rendemen measurement of pokea shell meat is average 27.8%. The results of this proximate composition analysis indicate that pokea shellfish can be classified as high protein of fishery products (more than 50%), low fat (below 5%). Macro minerals in fresh, boiled, and dried pokea meat are dominated by phosphorus, calcium, and potassium minerals. The result of taurine analysis on fresh, boiled, and dried pokea shell meat is not detected because it is below the limit of detection rate of 0.69, it can be caused because the taurine is a free amino acid that is easily soluble in water. The content of vitamins A and D in each treatment of pokea shell sample did not meet the limit of detection limit. This means that the vitamin A and D content of each sample of the pokea shell is very small less than the limit of device detection limit.

**Ethical Clearance:** Taken from University committee

**Conflict of Interest:** None

**Source of Funding:** Mandala Waluya Health Science College

**REFERENCES**


Geographically Weighted Regression (GWR) Approach in the Modeling of Malnutrition and the Influencing Factors in Muna Regency

Fitri Rachmillah Fadmi¹, Sri Mulyani¹, La Djabo Buton¹

¹Public Health Studies Program, College of Mandala Waluya Kendari Health Science, Kendari, Southeast Sulawesi Province, Indonesia

ABSTRACT

Malnutrition is a very alarming health problem in the international, national, inter-local and local area. Muna Regency is one of the regencies with the highest malnutrition case data in Southeast Sulawesi Province. The diversity of characteristics between regions determines the quality of health. Thus a significant factor to the response variable will certainly differ from one region to another. Therefore we need a statistical modeling method by taking into account the spatial aspect which is by using Geographically Weighted Regression (GWR) method. The Aim of this study to determine the modeling of malnutrition prevalence with GWR approach and the influencing factors in Muna Regency. The research method used in this research is non-reactive or unobtrusive method. Population and sample in this research is all data of malnutrition in Health Service of Muna Regency with 22 Districts as the unit of analysis. The results obtained showed that GWR model of malnutrition in Muna Regency obtained is $1.023651 + 0.001664X_3 + 0.032492X_4 + 0.010635X_6$. The WGR model produces predictor variables that significantly influence the number of new cases of leprosy in Muna Regency, ie Percentage of Households using clean water sources ($X_3$), Percentage of Low Birth Weight ($X_4$) and Percentage of Under-fives who weigh Below the Red Line (BRL) ($X_6$). It is expected that further research should use variables that include local socio-cultural elements so that the expected outcomes are able to explain the local conditions of the area. Besides, the researcher can use other more specific methods to get the maximum result.

Keywords: Malnutrition, Spatial, GWR

INTRODUCTION

Malnutrition is not a new problem, but this problem remains actual, especially in developing countries because it has a very real impact on the emergence of nutritional problems. One of the factors causing the emergence of this situation is the growing number of people in various developing countries that tend to overflow, while the food production has not been able to balance it even though the latest technology has already been applied.

The Global Situation based on World Health Organization (WHO) data in 2015 shows that the number of child deaths under the age of 5 reaches 5.9 million worldwide. Nutrition-related factors contribute about 45% of deaths in children under the age of 5. Malnourished children, especially those with acute malnutrition, have a higher risk of death from common childhood illnesses such as diarrhea, pneumonia, and malaria.

According to the Head of Health Research and Development Ministry of Health Trihono said that from the Riskesdas (Basic Health Research) data, the tendency of malnourished under-fives in each province in 2008 has amounted to 19.6%, this is an increase from the previous 18.4%. While the area with the highest malnourished under-fives case is East Nusa Tenggara with 34%.

Malnutrition problem also occurs in the Southeast Sulawesi Province. Data from the Health Office of Southeast Sulawesi Province shows that malnutrition
cases in 2014 reached 250 cases although this number is low compared to 2013 with 333 cases. Whereas in 2015 the case of malnutrition still reached 245 cases. These malnutrition cases are found in all districts and cities throughout Southeast Sulawesi Province. Most cases of malnutrition in 2015 were found in Muna Regency with 45 cases, then Bombana District with 33 cases, and Buton District with 28 cases.

GWR is a simple regression model that takes into account the location factor of observation and generates local model parameter estimators for each point where the data is observed. The response variable in the GWR model is predicted by the predictor variable whose respective regression coefficients depend on the location where the data is observed (Fotheringham, et al 2002). GWR modeling is used to find out the dominant factor that has the most influence on the condition of malnourished children under five years old in each district in Muna Regency by looking at the model formed. By using GWR method, it is hoped able to produce specific malnutrition under-fives model in each region so it can be more informative and applicative in determining malnutrition prevention policy in Muna Regency.

MATERIALS AND METHOD

Data used in this research is secondary data obtained from Muna Regency Health Office and Central Bureau of Statistics (Badan Pusat Statistik - BPS). These data include malnutrition data and factors affecting malnourished child under five status in 2015 in 22 districts in Muna Regency.

Variables used in this study include respond variables and predictor variables. The response variable is a case of malnutrition. Predictor variables are percentage of exclusively breastfed infants ($X_1$), percentage of infants received vitamin A ($X_2$), percentage of households using clean water sources ($X_3$), percentage of low birth weight (LBW) ($X_4$), percentage of maternity mother assisted by health personnel ($X_5$) and Percentage of Under-fives who weigh Below the Red Line (BRL) ($X_6$).

Processing and data analysis were using some software, including: Arcview 3.2, to make map of Muna Regency per District, OpenJUMP 1.7.0, to combine map and data, and OpenGeoda 1.2.0, to determine geographical location of each district, to know spatial data aspect and spatial data analysis, GWR 4.0, to analyze the GWR model.

RESULTS

Description of districts in Buton Regency is based on malnutrition variable and influencing factors using descriptive analysis and thematic map. Descriptive analysis of new cases of leprosy and the influencing factors are presented in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std dev</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malnutrition Cases (Y)</td>
<td>0.44</td>
<td>0.38</td>
<td>0.00</td>
<td>1.40</td>
</tr>
<tr>
<td>percentage of exclusively breastfed infants ($X_1$)</td>
<td>74.82</td>
<td>17.12</td>
<td>0.00</td>
<td>88.45</td>
</tr>
<tr>
<td>percentage of infants received vitamin A ($X_2$)</td>
<td>32.07</td>
<td>21.95</td>
<td>0.00</td>
<td>96.30</td>
</tr>
<tr>
<td>percentage of households using clean water sources($X_3$)</td>
<td>66.51</td>
<td>37.11</td>
<td>0.00</td>
<td>100.00</td>
</tr>
<tr>
<td>percentage of low birth weight (LBW) ($X_4$)</td>
<td>2.86</td>
<td>2.50</td>
<td>0.00</td>
<td>9.80</td>
</tr>
<tr>
<td>percentage of maternity mother assisted by health personnel ($X_5$)</td>
<td>85.6</td>
<td>20.4</td>
<td>0.00</td>
<td>100</td>
</tr>
<tr>
<td>Percentage of Under-fives who weigh Below the Red Line (BRL) ($X_6$)</td>
<td>5.57</td>
<td>6.498</td>
<td>0.00</td>
<td>27.93</td>
</tr>
</tbody>
</table>

Table 1 shows that the mean and the std of malnutrition cases in Muna Regency in 2015 were 0.44 and 0.38 with a minimum percentage of 0% and a maximum percentage of 1.40% patients. The mean and the std on the percentage of exclusively breastfed infants in each district were 74.82 and 17.12, with a minimum percentage of 0% and a maximum percentage of 88.45%. Mean and the std on the percentage of infants who received vitamin A in each district were 32, 07 and 21.95, with a minimum percentage of 0% and a maximum percentage of 96.30%. The mean and the std on the percentage of households using clean water sources in
each district were 66.51 and 37.11, with a minimum percentage of 0% and a maximum percentage of 100%. The mean and the std on the percentage of low birth weight (LBW) in each district were 2.86 and 2.50, with a minimum percentage of 0% and a maximum percentage of 9.80%. The mean and the std on the percentage of maternity mother assisted by health personnel in each district were 85.6 and 20.4, with a minimum percentage of 0% and a maximum percentage of 100%. The mean and the std on the percentage of Under-fives who weigh Below the Red Line (BRL) in each district is 5.57 and 6.49, with a minimum percentage of 0% and a maximum percentage of 27.93%.

Descriptive analysis of cases of malnutrition and the influencing factors by using the map can be seen from the value of each variable on the thematic map which is grouped into three categories: low, medium and high as shown in Figure 1. Of 22 districts in Muna Regency, Spatial Pattern of Malnutrition and the influencing factors were in the medium category, with the most distribution area is in Parigi and Pasir Putih.

![Figure 1. Distribution of Malnutrition and the Influencing Factors in Each District](image)

**Geographically Weighted Regression (GWR) Model**

Geographically Weighted Regression (GWR) model is the development of a regression model in which each parameter is calculated at each location point, so that each geographical location point has different regression parameter values. The first step before doing GWR modeling is by first determining the geographical location of each district in Muna Regency. Then determine the optimum bandwidth (G), where the optimum bandwidth selection is using CV (Cross Validation) criteria. The obtained optimum bandwidth value is then searched for weighted value. The weights used are the adaptive Gaussian kernel weights because the minimum AIC value with the optimum bandwidth is 22. It means that there are 22 neighbors that have a significant spatial relationship with a region. In the GWR results also obtained a Residual sum of square value of 0.185238. The smaller the residual sum of square values, the better the model will be. The values are then used to find the weighting matrix in each district. For example, the weighted matrix \((u, v)\) is \(W(u, v)\).

**Parameter Test GWR Model**

Model parameters testing on GWR aims to determine the factors that affect malnutrition for each district in Muna Regency. Therefore, each region has a model with different parameter characteristics with other regions. A parameter is said to be significant if the tcount is greater than ttable with a real level of 10%. The obtained ttable value is 1.81. This means, if the value of tcount on each parameter is greater than 1.81 then the parameter has an effect on malnutrition. The test results of GWR model parameters are presented in Table 2.
Table 2 Parameter Value of GWR Model per sub-district in MunaRegency

<table>
<thead>
<tr>
<th>No</th>
<th>Kecamatan</th>
<th>X₁</th>
<th>X₂</th>
<th>X₃</th>
<th>X₄</th>
<th>X₅</th>
<th>X₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Batukara</td>
<td>-1.510</td>
<td>0.472</td>
<td>2.040</td>
<td>2.576</td>
<td>1.291</td>
<td>2.398</td>
</tr>
<tr>
<td>2</td>
<td>Bone</td>
<td>-0.998</td>
<td>0.265</td>
<td>1.606</td>
<td>2.767</td>
<td>0.829</td>
<td>2.073</td>
</tr>
<tr>
<td>3</td>
<td>Kabawo</td>
<td>-1.087</td>
<td>0.263</td>
<td>1.669</td>
<td>2.766</td>
<td>0.912</td>
<td>2.093</td>
</tr>
<tr>
<td>4</td>
<td>Kontukowuna</td>
<td>-1.115</td>
<td>0.241</td>
<td>1.685</td>
<td>2.756</td>
<td>0.942</td>
<td>2.109</td>
</tr>
<tr>
<td>5</td>
<td>Maligano</td>
<td>-1.544</td>
<td>0.458</td>
<td>2.061</td>
<td>2.543</td>
<td>1.332</td>
<td>2.433</td>
</tr>
<tr>
<td>6</td>
<td>Marobo</td>
<td>-0.988</td>
<td>0.238</td>
<td>1.593</td>
<td>2.763</td>
<td>0.825</td>
<td>2.075</td>
</tr>
<tr>
<td>7</td>
<td>Parigi</td>
<td>-1.026</td>
<td>0.258</td>
<td>1.625</td>
<td>2.770</td>
<td>0.856</td>
<td>2.075</td>
</tr>
<tr>
<td>8</td>
<td>Pasikolaga</td>
<td>-1.353</td>
<td>0.451</td>
<td>1.917</td>
<td>2.685</td>
<td>1.133</td>
<td>2.237</td>
</tr>
<tr>
<td>9</td>
<td>Pasir putih</td>
<td>-1.317</td>
<td>0.445</td>
<td>1.890</td>
<td>2.689</td>
<td>1.100</td>
<td>2.223</td>
</tr>
<tr>
<td>10</td>
<td>Tongkuno</td>
<td>-1.134</td>
<td>0.318</td>
<td>1.717</td>
<td>2.762</td>
<td>0.948</td>
<td>2.109</td>
</tr>
<tr>
<td>11</td>
<td>Tongkuno selatan</td>
<td>-1.024</td>
<td>0.290</td>
<td>1.631</td>
<td>2.767</td>
<td>0.849</td>
<td>2.077</td>
</tr>
<tr>
<td>12</td>
<td>Towea</td>
<td>-1.544</td>
<td>0.404</td>
<td>2.043</td>
<td>2.528</td>
<td>1.344</td>
<td>2.440</td>
</tr>
<tr>
<td>13</td>
<td>Wakorumba selatan</td>
<td>-1.473</td>
<td>0.476</td>
<td>2.014</td>
<td>2.601</td>
<td>1.252</td>
<td>2.352</td>
</tr>
<tr>
<td>14</td>
<td>Kabangka</td>
<td>-1.060</td>
<td>0.221</td>
<td>1.643</td>
<td>2.752</td>
<td>0.895</td>
<td>2.103</td>
</tr>
<tr>
<td>15</td>
<td>Kontunaga</td>
<td>-1.476</td>
<td>0.390</td>
<td>1.986</td>
<td>2.646</td>
<td>1.264</td>
<td>2.335</td>
</tr>
<tr>
<td>16</td>
<td>Batalaiworu</td>
<td>-1.529</td>
<td>0.421</td>
<td>2.037</td>
<td>2.590</td>
<td>1.317</td>
<td>2.399</td>
</tr>
<tr>
<td>17</td>
<td>Duruka</td>
<td>-1.485</td>
<td>0.426</td>
<td>2.005</td>
<td>2.631</td>
<td>1.269</td>
<td>2.349</td>
</tr>
<tr>
<td>18</td>
<td>Katobu</td>
<td>-1.512</td>
<td>0.425</td>
<td>2.025</td>
<td>2.607</td>
<td>1.298</td>
<td>2.380</td>
</tr>
<tr>
<td>19</td>
<td>Lasalepa</td>
<td>-1.551</td>
<td>0.412</td>
<td>2.050</td>
<td>2.563</td>
<td>1.342</td>
<td>2.424</td>
</tr>
<tr>
<td>20</td>
<td>Lohia</td>
<td>-1.441</td>
<td>0.422</td>
<td>1.970</td>
<td>2.667</td>
<td>1.223</td>
<td>2.296</td>
</tr>
<tr>
<td>21</td>
<td>Napabalano</td>
<td>-1.552</td>
<td>0.401</td>
<td>2.048</td>
<td>2.543</td>
<td>1.348</td>
<td>2.435</td>
</tr>
<tr>
<td>22</td>
<td>Watopute</td>
<td>-1.518</td>
<td>0.375</td>
<td>2.015</td>
<td>2.598</td>
<td>1.313</td>
<td>2.388</td>
</tr>
</tbody>
</table>

Predictor variables that significantly affect malnutrition cases in Muna Regency are Percentage of Households using clean water sources (X₁), Percentage of Low Birth Weight (X₄) and Percentage of Under-fives who weigh below the red line (X₆) as shown in Figure 2

![Figure 2. Distribution of Malnutrition and the Influencing Factors in Each District](image-url)
Based on the result of grouping of significant variables, it can be formed GWR model in each district. The equation of GWR model of Case of Malnutrition in Muna Regency is as follows:

\[ 1.023651 + 0.001664X_3 + 0.032492X_4 + 0.010635X_6 \]

**DISCUSSION**

The result of GWR modeling analysis shows that the percentage increase of household using clean water sources will increase the number of malnutrition cases by 0.001664 with the condition that other variables are constant. This finding agrees with past literatures that have shown that the nutritional status of a child is related to the overall nutritional status of the household. Having toilet in the household has a significant negative effect on the probability of stunting. This is not surprising as better sanitary conditions lower the risk of infectious diseases and malnutrition. Similarly, access to clean water reduces the incidence of stunting among the sample children. Clean water and toilet are health variables that have been shown in the literatures to contribute to improved nutritional status of children. In general, the condition of households using clean water sources almost covers all Muna Regency, but some areas with a high percentage of clean water usage actually have higher percentage of malnutrition cases compared with other regions.

Then increase the percentage of LBW will increase the number of malnutrition cases by 0.032492 provided that other variables are constant. Greater morbidity among children with LBW results in poor physical growth and development that is perceived as malnutrition. A similar explanation has been given based on a study on infant girls born with LBW in developing countries. He found that children with LBW experienced adolescence period and the ensuing malnutrition ultimately led to increased risk of maternal complications in later life. Similarly, as expressed that low birth weight babies are babies who born with the weigh less than 2500 grams. Low birth weight is caused by premature birth or intrauterine growth retardation. Premature babies have organs and body that have not functioned normally to survive outside the womb so that the younger the pregnancy, the function of the organ becomes less functioning and the prognosis is also less good. LBW groups often get complications from immature organs due to premature births. Conditions in Muna Regency indicate that the LBW problem still continues to be a health problem every year so it has the risk to become the main cause of malnutrition of infants in Muna Regency. This is allegedly triggered by the socioeconomic status that is still in below average.

BPS of Muna Regency indicates that the main source of income of residents in Muna is the trade and industry sector, where the most common economic facilities are kiosks, shops, and food stalls. The socioeconomic condition of the family is thought to be one of the factors that trigger the nutritional problems in Muna Regency. The socioeconomic condition of the family is one of the factors that determine the amount of food available in the family so that it also determines the nutritional status of the family. Thus, the low socioeconomic circumstances will cause the level of education in general, and particularly, for parents also become low. Parents, especially mothers, play an important role in determining the nutrition for their family members, so the knowledge about nutrition should be known by mothers as a provision in improving nutritional status for their family. In accordance with other studies, low birth weight was found to be a risk factor of child malnutrition.

The results of the corresponding theory analysis are also on the Lower Boundary Line where an increase in the percentage of infants weighing below the Red Line will increase the number of malnutrition cases by 0.010635 with the condition that other variables are constant. This is also in accordance with the theory, as revealed that infants who weigh BRL are underweight with weight-for-age below the red line on KMS. The under-fives who weigh BRL do not necessarily mean that they are suffering from malnutrition or poor nutrition. However, it can be an early indicator that the child is experiencing nutritional problems. Nutrition under the red line is a severe poor nutritional caused by low consumption of energy and protein from daily food and occurs over a long period of time. Which if not handled properly will turn into malnutrition.

**CONCLUSION**

The spatial pattern of Malnutrition and the influencing factors in Muna Regency is generally in the medium category. The GWR model of malnutrition in Muna Regency obtained Geographically Weighted
Regression Model (GWR) produces predictor variables that significantly influence malnutrition in Muna Regency, which are Percentage of Households using clean water sources ($X_3$), Percentage of Low Birth Weight ($X_4$) and Percentage of Under-fives who weigh below the red line ($X_6$). Suggestion recommended that the next research should have samples on the smaller level (village or health center area) to sharpen its spatial analysis. The variables used should also include local socio-cultural elements, so the final result is expected to explain the local conditions of the area. Besides, the researcher can further use other more specific methods to get the maximum result.

Conflict of Interest: The authors have no conflicts of interest associated with the material presented in this paper.

Sourch Funding: This work supported by foundation of College of Mandala Waluya Kendari

Ethical Clearance: From University committee

REFERENCES

The Effect of Technical and Functional of Health Service Quality Toward the Image of Faisal Islamic Hospital

Alwy Arifin1, Nisrina Nursakinah1, Darmawansyah1, Saifuddin Sirajuddin2, Dian Saputra Marzuki1

1Administration and Health Policy Departemen, Faculty of Public Health Hasanuddin University, Makassar; 2Nutrition Program, Faculty of Public Health Hasanuddin University, Makassar

ABSTRACT

Hospital services industry is required to provide prime quality to patients, because patients will provide subjective assessment or form a direct perception of the hospital brand image. This study aims to determine the effect of service quality on hospital image at installation of Faisal Islamic Hospital Makassar City. This research uses quantitative method with cross sectional study approach. The population were all patients treated at Inpatient Installation of Faisal Islamic Hospital. Samples were collected by systematic random sampling method with 223 respondent through interview using questionnaires. The data analysis used was chi-square and multiple logistic regression analysis. The results indicate that there are influences over professionalism (p = 0.016), accessibility (p = 0.016), competency (p = 0.34), and communication (p = 0.121), tangible (0.012), assurance (0.016). There is no effect of communication (0.07) toward image. Based on multiple logistic regression test simultaneously, assurance is the influential variable on hospital image in Faisal Islamic Hospital Makassar.

Keywords: functional quality, hospital image

INTRODUCTION

Hospital is a health facility that plays an important role in improving the health status of the community. The increasing number of hospitals in the city of Makassar causes all hospitals become more competitive. In addition, Indonesia Services Dialog (ISD) recorded the number of Indonesians who went abroad continues to increase, from 350 thousand people in 2006 to 600 thousand people during late 2015. The cost spent was swelled from USD 500 million to USD 1.4 billion (equivalent to IDR 18.2 trillion). The results of previous research found that the tendency to conduct medical examinations and treatment abroad caused by the assessment of health services in the country that is less conducive. Its quality, teamwork, ethics, and facilities are less reliable and satisfactory1.

The cost to bring in new customers is greater than the cost of maintaining existing customers2. It would, therefore, be much better for hospitals to retain existing patients by displaying and providing quality of health services. Imagery is an important step for the hospital because it can encourage customer loyalty. Its image and strategy can indirectly be a source of corporate excellence in facing competition and demands from customers3.

According to Gronroos, the image built by the quality that customers receive from previous experience (professionalism) and the way services are delivered, namely attitudes, accessibility, reliability, service recovery and servicescape4. Positive image and the dignity of the hospital can be achieved by telling patient’s satisfaction to others. This accumulatively benefits the hospital because it becomes indirect hospital marketing.

The increasing numbers of hospitals as well as the competition of hospitals also have an impact on the reduced number of visits at Faisal Islamic Hospital. Faisal Islamic Hospital is a Private Hospital Type B that seeks to improve the quality of services provided to patients, but the number of patient visits and BOR (Bed Occupancy Rate) is declining. The number indicates Faisal Islamic Hospital has decreased specialization of treatment by the society. The location of Islam Faisal Hospital is strategically located in the middle of Makassar City.
Previous research found that the quality of service affects the number of patient visits and the decision to buy patients\(^6\). It is supported by Sutrisno, et al\(^7\), who studied the image as the influence of patient visits in the hospital, where the image affected the patient’s visit. Image is formed from two dimensions of quality: technical and functional quality. According to previous research, there was a relationship between functional quality of attitude, reliability, accessibility and service recovery with hospital image\(^8\). Study by Herawati\(^9\) demonstrated that there is a correlation between technical quality consisting of professionalism and skill to hospital image, there is also relationship of functional quality of attitude, reliability, accessibility, flexibility, service recovery and service cape to hospital image as well.

Because the image perspective occupies the minds of the public, organization should make various efforts to avoid a wrong perception of community to the organization which then makes a negative image. The image of the organization, therefore, should be considered in such a way that the public perception is not far deviate from what is expected\(^10\). The purpose of this study is to determine the effect of technical and functional quality to the image of Faisal Islamic Hospital.

**MATERIAL AND METHOD**

**Study Setting and Design**

This study was conducted at the inpatient unit of Faisal Islamic Hospital, Andi Pangeran Pettarani Street, Makassar City. The type of this study was observational with cross sectional design. The analytic study was conducted with the intention to identify the study variables, investigate the relation between technical and functional quality with the image assessment to the Inpatient Installation at Faisal Islamic Hospital of Makassar City.

**Population and Sample**

Population of this study was all patients from inpatient unit of RSI Faisal Makassar in 2016. The total population until 2016 was 6363 patients. Samples were determined using Stanley Lameshow’s formula, so that 223 people were chosen by accidental sampling that had met the inclusion criteria.

**Method of Data Collection**

Primary data collected by researchers using questionnaires. Data characteristics of respondents, data affordability factor, comfort factor, information factor, measured by interviews using questionnaires. Secondary data collection obtained from relevant agencies of the Latemmanala General Hospital, Soppeng.

**Data Analysis**

Characteristic data of respondents measured using SPSS 16 software with univariate analysis by investigating at the frequency distribution of respondent characteristics. While the data for technical and functional quality variables were measured by using bivariate analysis by investigating its cross tabulation result and significant value. Furthermore, multivariate analysis is performed by including all variables and investigating the factors which have the most influence on the dependent variable.

**RESULTS**

**Sample Characteristics**

According to table 1, most of respondents are aged 16-30 years (88 respondents, 39.5%), while at least aged more than 60 years, as many as 23 (10.3%).

**Table 1. Respondents Frequency Distribution Based on Respondent**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total (N) = 208</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-15</td>
<td>27</td>
<td>12.1</td>
</tr>
<tr>
<td>16-30</td>
<td>88</td>
<td>39.5</td>
</tr>
<tr>
<td>31-45</td>
<td>61</td>
<td>27.4</td>
</tr>
<tr>
<td>46-60</td>
<td>24</td>
<td>10.8</td>
</tr>
</tbody>
</table>
Based on sex characteristics, most of respondents are women as many as 128 (57.4%), while the least was male as many as 95 (42.6%). The last educational characteristic showed that most respondents were high school graduated as many as 130 (58.3%), while the least were no educational graduated as many as 7 (3.1%).

Table 2 shows that of 193 respondents who have assessment with good health professionalism, 178 respondents (92.2%) rated positive image and 15 respondents (7.8%) assessed negative image for hospital. While from 30 respondents who have poor health professionalism, 23 respondents (76.7%) assessed positive image and 7 respondents (23.3%) assessed negative image for hospital. Of 209 respondents who have good health officer attitude assessment, as many as 192 respondents (91.9%) rated the positive image and 17 respondents (8.1%) assessed the negative image of the hospital. Fourteen respondents (64.3%) assessed positive image and 5 respondents (35.7%) assessed negative image for hospital. One hundred and ninety-six respondents stated good competency, 180 respondents (91.6%) assessed positive image and 16 respondents (8.2%) assessed negative image for hospital. Of the 27 respondents who had poor access assessment to hospitals, 21 respondents (77.8%) rated positive images and 6 respondents (22.2%) rated negative images to hospital.

Table 2. Influence of Study Variables to Patients Satisfaction in Inpatient Unit of Faisal Islamic Hospital of Makassar, 2017

<table>
<thead>
<tr>
<th>Study Variables</th>
<th>Patient’s Satisfaction</th>
<th>Total</th>
<th>Statistic Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Satisfied</td>
<td>Not Satisfied</td>
<td>n %</td>
</tr>
<tr>
<td>Professionalism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>178</td>
<td>15</td>
<td>92.2</td>
</tr>
<tr>
<td>Not good</td>
<td>23</td>
<td>7</td>
<td>76.7%</td>
</tr>
<tr>
<td>Access</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>192</td>
<td>17</td>
<td>91.9%</td>
</tr>
<tr>
<td>Not good</td>
<td>9</td>
<td>5</td>
<td>64.3%</td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>180</td>
<td>16</td>
<td>91.6%</td>
</tr>
<tr>
<td>Not good</td>
<td>21</td>
<td>6</td>
<td>77.8%</td>
</tr>
</tbody>
</table>
Table 2 also shows that of the 199 respondents who had good assessment for healthcare communication, 182 respondents (91.5%) rated positive image and 17 respondents (8.5%) rated negative image. While 24 respondents had poor assessment for communication of health officer, 19 respondents (79.2%) assessed positive image and 5 respondents (20.8%) assessed negative image. Physical environment variable shows that from 97 respondents who stated good tangible, 93 respondents (95.9%) assessed positive image and 4 respondents (4.1%) assessed negative image to hospital. While 126 respondents who stated less good tangible, as many as 108 respondents (85.7%) who assessed positive image and 18 respondents (14.3%) assessed negative image. Assurance variables showed that 193 respondents stated that they had better assurance, 178 respondents (92.2%) rated positive image and 15 respondents (7.8%) assessed negative image to the hospital. While 30 respondents who have poor physical environment, as many as 23 respondents (76.7%) rate positive and 7 respondents (23.3%) assessed negative image.

Table 3. Result of Dual Form of Logistic Regression Test of Quality Variable of Care Providing to Hospital Image in Inpatient Unit of Faisal Islamic Hospital, Makassar, 2017

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E</th>
<th>Wald</th>
<th>Df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionalism</td>
<td>0.679</td>
<td>0.778</td>
<td>0.762</td>
<td>1</td>
<td>0.383</td>
<td>1.972</td>
</tr>
<tr>
<td>Access</td>
<td>-1.789</td>
<td>1.282</td>
<td>1.946</td>
<td>1</td>
<td>0.163</td>
<td>0.167</td>
</tr>
<tr>
<td>Competence</td>
<td>1.505</td>
<td>1.201</td>
<td>1.571</td>
<td>1</td>
<td>0.210</td>
<td>4.506</td>
</tr>
<tr>
<td>Communication</td>
<td>-0.051</td>
<td>0.744</td>
<td>0.005</td>
<td>1</td>
<td>0.945</td>
<td>0.950</td>
</tr>
<tr>
<td>Physical Environment</td>
<td>0.899</td>
<td>0.620</td>
<td>2.102</td>
<td>1</td>
<td>0.147</td>
<td>2.457</td>
</tr>
<tr>
<td>Assurance</td>
<td>1.175</td>
<td>0.597</td>
<td>3.875</td>
<td>1</td>
<td>0.049</td>
<td>3.238</td>
</tr>
<tr>
<td>Constant</td>
<td>1.234</td>
<td>.730</td>
<td>2.860</td>
<td>1</td>
<td>.091</td>
<td>3.436</td>
</tr>
</tbody>
</table>

Table 3 demonstrates that the logistic regression shows the most influential variable on the image by assessing the highest value of influence on the recovery service variable with the value of Wald as high as 3.875 times to the hospital image with the p value = 0.049

**DISCUSSION**

In this study we find that the health professionalism is considered good by patients and their family. The result of study also shows that professionalism has a significant influence on the good image of hospital. It makes, therefore, hypothesis is accepted. The results support the study conducted by Gunawan\(^1\), which concluded there is a unidirectional relationship between knowledge and skills in the professionalism to patient satisfaction that certainly affect the image of the hospital. The results of this study indicate that access Faisal Islamic Hospital is good; this is because of the location is quite strategically located in the middle of Makassar City and public transportation can be easily accessed to RSI Faisal. The results of this study are similar with the result of study conducted by Ikmal et al\(^3\), that there is influence of accessibility of patient or family service to hospital image. The competence variable is positively related to the hospital image. Researcher’s assumption is the image of the Hospital is good due to the uncomplicated acceptance procedure so that the patient is easy to receive treatment. The findings are similar to Stephanie’s study\(^12\); a good competence will increase hospital image.

Communication variables do not have a significant relationship with hospital image. This study is not in line with research conducted by Syafei\(^13\); communication has an effect on hospital image. The result of study also shows that physical environment variable has a significant influence to hospital image. The results of this study are in line with the results of study by Batubara\(^14\), that partially there is a significant influence of physical environment variables on hospital brand image. Assurance variable affects the image of the hospital. This study is similar with study by Poniman\(^15\); assurance variable correlated positively with image; probability value is 0.016.

Multivariate analysis with multiple logistic
regression test showed that assurance variable was the most influential variable with \textit{wald} value as high as 3,875.

**CONCLUSION AND RECOMMENDATION**

Based on the results of this study, it can be concluded that there is a significant influence of variables consisting of professionalism, access, competence, physical environment, and assurance. There is, however, no significant influence on communication variables. Assurance variables become the most influential variable on hospital image. To improve the comfort of patients and families, the presence of parking areas should be noted due to the condition of the parking area is still bad. Assurance variables, that most affect the image of Faisal Islamic Hospital, need to be maintained and improved.

**Conflict of Interest**: Authors declare that no conflict of interest within this publication

**Ethical Clearance**: Ethical clearance by Faculty of Public Health, Hasanuddin University, Makassar

**Source Funding**: Source funding from authors themselves

**REFERENCES**

Model Development of Clinical Learning with Outcome Present Test Method Peer Learning and Application in Medical Surgical Nursing Stase for the Student of Nurse in Stikes Mandala Waluya

Asbath Said¹, Israeli¹, Sartini Risky¹, Ari Novitasari¹, Dwi Wulandari¹, Dewi sari Pratiwi¹

¹STIKES Mandala Waluya Kendari Southeast Sulawesi, Indonesia

ABSTRACT

Nursing clinical education is an instrument in improving the clinical reasoning skills of students. One of learning models of clinical reasoning that is used to improve clinical reasoning skills in nursing education is the Outcome-Present Test Model (OPT). OPT is a nursing process model that is designed to develop the skills of learners’ clinical reasoning and the focus of the model are the results (outcomes) and thinking behind (backward) to change the client from his health status at this time (the present state) to the desired state (outcome). In other words, a very simple model that consists of only 1 (one) page makes the learning improving clinical reasoning skills more easily and reduce the element of copy and paste in the documentation. While peer learning is an effective strategy to address the problem in which the students will be divided into several groups of 2-3 students. To obtain the result, this learning model uses research development method with the respondents 10 clinics and institutions preceptor and 30 students who practice in medical surgical nursing state. The research results shows the level of student satisfaction after using Outcome-Present Test (OPT)-peer learning for 4 weeks, it affected with the value of α: 0,001. By using this model, not just a clinical reasoning that they get but they also will understand about how to use the diagnosis of NANDA, NIC and NOC. The next suggestion, this model can be a format in clinical learning in other departments

Keywords: Clinical Learning, Outcome-Present Test (OPT), peer learning

INTRODUCTION

Learning in the profession nurses are learning at this stage of clinical education is learning that focuses on direct engagement with patients and a wide variety of problems. In this environment, students learn to be a real nurse. A wide variety of skills like history taking, physical examination, communication with the patient, and very precise professionalism studied and trained at this educational stage. Knowledge of nursing science can be applied directly to provide care to patients so that students are motivated to teach¹

The fact the hospital, clinic guidance does not match the expectations of students due to some problems in the implementation of such guidance clinic, clinical instructor has double duty in addition to conducting clinical guidance². Coaching clinics do not have enough time to implement the guidance, not provided an adequate tool to implement nursing actions, lack of information on the academic part, do not understand the purpose of learning the clinic, do not have a special room for counseling or discussion, tend to use the old style in guiding curriculum instructor training clinics give less equipped to undertake coaching clinics, lack of interest in becoming a clinical instructor³ While some of the problems faced by the students is the lack of motivation to learn and the high stress in a program of professional nurses, especially in medical-surgical nursing stases for SKS greater burden.

Student of profession nurses Stikes Mandala Waluya sometimes complain of clinical learning models that they get in each field of practice, especially if they are doing clinical practice in hospitals in Southeast Sulawesi. Although some of the clinical instructor has conducted training preceptor but they have not been able to implement and even puzzled to implement. So that the
expected results of the academic that nursing students have the ability to provide nursing care in the short term and the long term is not achieved with the maximum. This can be corrected through some effort, which is to improve the learning process of the clinic, the hospital environment, improve clinical instructor and increase student involvement in clinical learning.

Repairs to all the components is a big job and give a long time, so in this study was limited to efforts to improve clinical learning process, such as the development of clinical teaching model to achieve competence in hospital nursing care in medical-surgical course.

Selection of research problems is done by two considerations. The first development of clinical teaching model of choice because it is considered necessary to the development of clinical learning models that can improve the quality of clinical learning in accordance with the real situation in the hospital that performed at the time of the survey. The second output is expected that the nurse is able to take decisions effectively, quickly and precisely in treating patients. So that it can train students' critical thinking skills when facing cases experienced by the patient under management during clinical practice. Clinical Reasoning is an essential component in nursing practice. In the face of the needs of the service system is complex and dynamic, requires nursing practice nurses who are able to think and make decisions effectively. Hopefully with OPT-peer learning methods can be overcome faced by nurses and professional program participants the program manager for this study.

The specific objectives of this research are:

Knowing picture learning model hospital clinics used in clinical learning process especially medical-surgical nursing course at this time.

Finding the clinical learning development model that is used in the process of learning a special clinic medical-surgical nursing courses.

Testing the quality of clinical teaching model in hospitals result of the development, especially in the subject of medical-surgical nursing.

**MATERIALS AND METHOD**

The method used in this study is a research and development method. This research method is used to produce a particular product, and test the effectiveness of the product. Learning product that will be developed in this study is a clinical learning model that is expected to improve clinical learning in performing nursing care in hospitals.

Respondents in this research were Nursing Students whom perform service in nursing medical surgery stage at RS. Santa Ana Kendari.

Research conducted on student nurses profession were 30 people while doing in medical-surgical nursing stage in two hospitals. As for the implementation measures outlined in the study the chart below.

![Figure 1 Research Method](chart.png)
RESULTS

The Models testing is done by comparing the opinion of the students about the clinical learning process before and after using OPT Peer Group data in the form of interval scale. The value will be tested normality, if the data obtained is normally distributed then tested with independent t test in both study groups to see the difference in both groups using SPSS 18 program. If the data distribution is not normal then the data tested with Mann Whitney test.

Distribution of Respondents

This research was followed by 30 nursing students, table 1 shows the distribution of students by age. Based on the table below, most of the respondents are in the 20-25 year age range (66.6%) , and the least in the 30-35 age range (13.4%)

Table. 1 Distribution of respondents by age

<table>
<thead>
<tr>
<th>Age Respondents</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-25</td>
<td>20</td>
<td>66.6</td>
</tr>
<tr>
<td>25-30</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>30-35</td>
<td>4</td>
<td>13.4</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on the table below it is known that the distribution of respondents by sex Most women are 20 respondents (66.7%), while men are 10 respondents (33.3%). Table 2 shows the distribution of respondents by sex

Table. 2 Distribution of respondents by Sex

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>10</td>
<td>33.3</td>
</tr>
<tr>
<td>Female</td>
<td>20</td>
<td>66.7</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100</td>
</tr>
</tbody>
</table>

Analysis of Variables

Based on the table below it is known that shows the mean of 27 respondents in the pre-test is 28.07 (SD = 2.205), while the mean post test is 52.85 (SD = 2.239). From the results of the analysis obtained by value p = 0.001, which means that there are significant differences of student satisfaction before and after the use of models with a model clinical learning outcomes present test (OPT)- peer Learning student nurses profession stases KMB.

Table. 3 Analysis of respondents’ satisfaction

Using the OPT-Peer Learning model

<table>
<thead>
<tr>
<th>Student Satisfaction</th>
<th>Mean</th>
<th>SD</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Test</td>
<td>28.03</td>
<td>2.205</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Post Test</td>
<td>52.77</td>
<td>2.239</td>
<td></td>
</tr>
</tbody>
</table>

* Paired t test

DISCUSSION

Statistically, the use of models Present Outcome Test (OPT) with the approach of Peer Learning on Student nurse profession stases medical-surgical nursing has proved effective and significantly increase student satisfaction in the clinical learning process.

According to\(^5\), OPT is a model of clinical reasoning learning in the nursing process that is designed to help improve clinical reasoning skills in learners. Porpoises and Herman cited in\(^5\) adding that the main focus of the model OPT are the results (outcomes) that guides learners thinking behind the (backward) to change the client of his health status at this time (the present state), to state desired (outcome). Thus, this model can improve the management of client problems simultaneously.

In the development of OPT models are applied to 27 nurses stases KMB professional students, researchers found that a simple form of this model facilitate learners in understanding and conducting of clinical reasoning problems experienced by clients. This is evidenced by initial tests conducted by researchers with a case that has been designed previously to all learners, found only 6 students (22.2%) were able to establish appropriate nursing problems with the condition of the client, specify a destination, intervention, and evaluation, and at the end of stases KMB (after the participants are given the learning model OPT) test with the participants again given the same case and discovered that 19 students (70.4%) have been able to determine the client’s nursing problems appropriately. This shows the good progress shown by learners, even from interviews with five students researchers found a picture which suggested that the model of OPT students find it very easy to learn and develop the mindset critically and creatively in
determining any problems experienced by clients to be able to evaluate the results that have been specified in the client’s care.

The statement above is in line with studies conducted by\(^8\) which Students were more capable of identifying keystone issue accurately in the posttest, which suggested the effectiveness of OPT model in helping students organize and evaluate collected data to identify critical problems or patient’s needs.

The statement above is in line with studies conducted by\(^5\), which concluded that the use of the OPT at learners in the clinic is able to practice their skills in making comparisons, identifying key client issues, determine the intervention, and evaluate carefully. In addition, this model also supports learners to be more creative, critical, and able to think on an ongoing basis to determine the next nursing action.

One of the known learning methods to improve clinical reasoning skill in nursing education is Outcome-Present Test (OPT) model invented by\(^6\). OPT model is a nursing process model designed to develop clinical reasoning skill of the learners. The model focuses on nursing outcome through backward thinking in order to alter clients’ health condition from its present state to the desired outcome.

It is the one of who supports the results obtained by researchers where learning model OPT student nurses profession can improve student satisfaction during follow stases KMB clinic. By learning practically and easy, students can develop skills in accordance with desired competency targets. One of who contributed the achievement of good results from this study is due to the use of peer learning methods. As has explained by\(^7\), stated that Peer Learning is one of learning method in which students will be assisted by a teacher or a friend who has the same level of learning a concept or the capabilities (skills).

Peer learning approach essentially focused on training problem solving and highly effective way to improve creativity, execution of experiments, problem solving abilities, and learning difficult concepts. This is supported because the cooperative learning methods, allowing each student to get attention from the Preceptor and have plenty of time in talking or listening. And of course this gives students the opportunity to participate actively in building knowledge\(^9\).

It is not only from the aspect of students, OPT-Peer Learning models also provides good impact on the precept. From the evaluation conducted by researchers using interview techniques, found the information from one of precept that suggests “… with OPT models, simplify preceptor and presptee in studying the case of nursing so that existing problems can be developed …” From this information, researchers assume that with OPT-Peer Learning model of learning can be a media development is not for students only, but also for his own precept to further enhance the capabilities and knowledge needed in the clinic.

In addition, the implementation of Peer Learning used by precept change the paradigm of the relationship between precept and students. Comparing the results of a preliminary study conducted by researchers obtained information that they are confused with the pattern of a given task, the task of supervising the writing implement much so that the orientation of students complete a task while in terms of feedback from the supervising institutions and clinics still felt lacking. That is, communication between tutors and students more emphasis on the completion of tasks and less help students in solving the problems experienced during clinic practice. However, from the process of implementing the model OPT-Peer Learning researchers discover new things related to the pattern of the relationship between the precepts of the students. From interviews, found information that the model OPT-Peer Learning can change the pattern of relationships not only as educators between the two, but can be partners who jointly carry out treatments to clients, the intensity of the meetings to be better so that students are able to solve the problem by better anyway. It supported the statement on one precept which says “… the OPT-Peer Learning model can create relationships between preceptor and presptee be a partner in finding / solving the problems of nursing that happens …”

From the results obtained in this study, suggests that the clinical learning for students should be directed to the simpler without losing the essence of the expected standards of competence to the students. One of them with the application of OPT model with the Peer Learning approach that could form the clinical reasoning abilities of students; be more creative and critical in resolving the problems experienced by clients in many other cases the order.\(^{10-13}\)
CONCLUSION

OPT model with the Peer Learning approach effective where learning model OPT student nurses profession

Model OPT student nurses profession can improve student satisfaction during because it is very simple model and able to develop clinical reasoning but they also will understand about how to use the diagnosis of NANDA, NIC and NOC

OPT model with the Peer Learning approach not only used in nursing stase medical surgery but also can be used in any profession during stase nurse.

Conflict of Interest Author declear that no any conflict of interest on this research and publication

Source of Founding: This research supported by The Association of Indonesian Nurse Education Center Award Republic of Indonesia.

Ethical Clearance: Obtained from college committee

REFERENCE


Spatial and Temporal Epidemiological Study of Smear Positive Tuberculosis in Kendari, Southeast Sulawesi, Indonesia

Titi Saparina¹, Rachmawati¹, Lodes Hadju¹, Muhammad Guntur Nangi¹, Muhammad Isrul²

¹Public Health Departement, ²Pharmacy Departement, STIKES Mandala Waluya Kendari, South-East Sulawesi, Indonesia

ABSTRACT

Background: Tuberculosis (TB) is an infectious disease caused by the bacillus Mycobacterium tuberculosis. It is estimated that a third world population infected mycobacterium tuberculosis, 95% of cases and 98% of worldwide TB deaths occur in developing countries. Planning of pulmonary TB management, surveillance system should identified patient’s location to be map using spatial and temporal approach. This study aims to understand spatial and temporal pictures of smear positive pulmonary tuberculosis disease in Kendari. Study Design: Descriptive quantitative and ecologic study. Method: Population in this study is all pulmonary Tuberculosis patients with smear positive result located in Kendari and listed in tuberculosis register at Health Official in Kendari In 2011-2013. Preparation and analysis of data with Arview GIS 3.3 software to describe the distribution of Pulmonary Tuberculosis occurrence in Kendari in 2013. Result: Finding of smear positive Pulmonary Tuberculosis cases in 2011-2013 is in low category with percentage of case range between 0-35% in all districts in Kendari, meanwhile in 2013 finding of smear positive Pulmonary Tuberculosis case occurred in the populous districts that is Wua-Wua district with percentage of the case findings range between 36-69% in mild category. Increasing of TB cases occurred in 2013 as many as 1228 cases. Conclusions: Improving the strategy of overcoming, preventing, and dragging the case of pulmonary Tuberculosis particularly in vulnerable populous area which have high incidence cases in Kendari.

Keywords: Tuberculosis, Spatial, temporal, epidemiological study, Kendari

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by bacillus Mycobacterium tuberculosis. It typically affects the pulmonary (pulmonary TB) but can also affect other sites (extra pulmonary TB). The disease is spread when people who are sick with pulmonary TB expel bacteria into the air, for example by coughing. Overall, a relatively small proportion (5–15%) of the estimated 2–3 billion people infected with M. tuberculosis will develop TB disease during their lifetime. 95% of cases and 98% of worldwide TB deaths occur in developing countries.

In 2015, there were an estimated 10.4 million new (incident) TB cases worldwide. The best estimate is that there were 1.4 million TB deaths in 2015, and an additional 0.4 million deaths resulting from TB disease among HIV-positive people. The six countries that stood out as having the largest number of incident cases in 2015 were (in descending order) India, Indonesia, China, Nigeria, Pakistan and South Africa (combined, 60% of the global total). Of these, China, India and Indonesia alone accounted for 45% of global cases in 2015. Indonesia is the 3rd country with the largest number of TB case in the world. In Indonesia, it is estimated that there are 1,020,000 TB cases and TB prevalence rate in 2015 were 395 per 100,000 population per year with mortality rate were 40 per 100,000 population per year. TB occurs in more than 70% of productive age. In the meantime the economic losses due to TB are also quite large.

Data collected from Health Department of Southeast Sulawesi, during 2005-2007 of case fatality rate (CFR) of tuberculosis is range above 2 per 100 TB patients with smear positive. The highest number in 2005 was 3 per 100 patients of smear positive patients.
3,729 people (77.4%) with smear positive amounted to 1,002 people and In 2012, the number of Pulmonary tuberculosis patients were 3,804 people (78.3%) with smear positive to 1,203 patients while in 2013 the number of people with Pulmonary Tuberculosis increasing to 3,967 people with smear positive to 1,232 patients.

Kendari in 2011 Pulmonary tuberculosis patients as many as 609 people with smear positive as many as 447 people (74%) and in 2012 the patients are 609 people with smear positive as many as 479 people (79%) meanwhile in 2013 the number of Pulmonary Tuberculosis as many as 621 people with positive smear as many as 479 people (80%).

The Pulmonary Tuberculosis surveillance system in Indonesia is nationally under the supervision of the Directorate General of PP-PL (Eradication of Disease and Environmental Health) of the Health Ministry of the Republic of Indonesia. The action of disease control planning, surveillance systems should identify the location of the patient to be mapped using the Geographic Information System (GIS) approach. Geographic Information System is a computer-based system designed to collect, process, manipulate, and display spatial information.

Kendari is the capital of Southeast Sulawesi Province. It is located astronomically south of the equator between 3° 54’40" - 4° 5’05” south latitude and extends from West to East between 122° 26’33" - 122° 39’14” east longitude. Kendari city is divided into administrative area consists of 10 districts of Mandonga, Baruga, Puuwatu, Kadia, Wua-wua, Poasia, Abeli, Kambu, Kendari, and West Kendari. The land area of Kendari City is 295.69 km² or 0.76% of the land area of Southeast Sulawesi Province with a population density of 860 per km².

The objective of this study was to improve the performance of TB control programs by studying the pattern of smear positive TB patient spread in Kendari City through spatial and temporal approach.

**MATERIALS AND METHOD**

Research methodology applied in this study is a quantitative descriptive study and ecologic study based on time and place with spatial approach using SIG and temporal to observe the distribution of smear positive pulmonary tuberculosis occurrence based on districts area in Kendari in 2011-2013. Population in this study is all pulmonary Tuberculosis patients with smear positive result located in Kendari and listed in tuberculosis register at Health Official in Kendari In 2011-2013, that is 1839 cases. Besides, population in this study is area population and sample for this study is all smear positive Pulmonary Tuberculosis patients, met inclusive criteria that is smear positive pulmonary tuberculosis patients with complete address. Therefore sampling method applied is total sampling. For temporal analysis obtained data of Pulmonary Tuberculosis in 2011-2013, thus can be described month trend with highest pulmonary tuberculosis cases. Data sourced from Pulmonary Tuberculosis Register group based in the districts in Kendari, then submitted into field attributive at attribute table of Kendari city at Arview GIS 3 software.

**RESULTS**

**SPATIAL DESCRIPTION**

Studies conducted with spatial approach describe the occurrence of Pulmonary Tuberculosis based on the districts area in Kendari. The number of smear positive Tuberculosis patients will describe based on the districts in Kendari in 2011-2013 Table 1 and figure 1).

<table>
<thead>
<tr>
<th>No.</th>
<th>Districts</th>
<th>The number of smear positive Pulmonary Tuberculosis Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2011</td>
</tr>
<tr>
<td>1.</td>
<td>Mandonga</td>
<td>15</td>
</tr>
<tr>
<td>2.</td>
<td>Kendari</td>
<td>85</td>
</tr>
<tr>
<td>3.</td>
<td>Baruga</td>
<td>55</td>
</tr>
<tr>
<td>4.</td>
<td>Poasia</td>
<td>12</td>
</tr>
</tbody>
</table>
The Result (Table 1) reveal that the highest incidence number of smear positive Pulmonary Tuberculosis was in Wua-Wua district in 2011 as many as 115 cases or 22.9% and in 2012 the highest incidence number of smear positive Pulmonary tuberculosis was in West Kendari district as many as 253 cases or 29.8% and in 2013 the highest incidence number of smear positive Pulmonary Tuberculosis was in Wua–Wua district as many as 469 cases or 38.3%.

The findings of smear positive pulmonary tuberculosis cases in Kendari from 2011 to 2012 is in the low category with the case finding percentage ranged between 0-35% in all districts in Kendari meanwhile in 2013 the findings of smear positive pulmonary tuberculosis cases in the very populous districts that is Wua-Wua district with the percentage number of case finding range between 36-69% in medium category.

**Temporal Description**

Temporal description is a study based on time. The study describe the time of the incidence of the pulmonary tuberculosis described based on the month, that observe between month and the highest incidence of Pulmonary Tuberculosis in Kendari (Table 2-4). Data from 2011 (Table 2) reveal that in June the number of incidence of the smear positive Pulmonary Tuberculosis cases as many as 15 cases or 14.9% in West Kendari district and 15 cases or 13% in Wua-Wua district.

### Table 2. Distribution of the incidence of smear positive Pulmonary Tuberculosis in Kendari

<table>
<thead>
<tr>
<th>No.</th>
<th>District</th>
<th>Month</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Jan</td>
<td>Feb</td>
</tr>
<tr>
<td>1</td>
<td>Mandonga</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Kendari</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Baruga</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Poasia</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>West Kendari</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>Abeli</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Puwatu</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>Kadia</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Wua-wua</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>Kambu</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>501</td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Distribution of the incidence of smear positive Pulmonary Tuberculosis in Kendari Each district based on month in 2012

<table>
<thead>
<tr>
<th>No.</th>
<th>District</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mandonga</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>13</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>59</td>
</tr>
<tr>
<td>2</td>
<td>Kendari</td>
<td>12</td>
<td>8</td>
<td>12</td>
<td>15</td>
<td>11</td>
<td>9</td>
<td>13</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>10</td>
<td>111</td>
</tr>
<tr>
<td>3</td>
<td>Baruga</td>
<td>0</td>
<td>4</td>
<td>7</td>
<td>13</td>
<td>11</td>
<td>8</td>
<td>15</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>79</td>
</tr>
<tr>
<td>4</td>
<td>Poasia</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>33</td>
</tr>
<tr>
<td>5</td>
<td>West Kendari</td>
<td>16</td>
<td>12</td>
<td>18</td>
<td>20</td>
<td>16</td>
<td>18</td>
<td>18</td>
<td>16</td>
<td>8</td>
<td>17</td>
<td>10</td>
<td>14</td>
<td>253</td>
</tr>
<tr>
<td>6</td>
<td>Abeli</td>
<td>5</td>
<td>7</td>
<td>4</td>
<td>12</td>
<td>15</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>18</td>
<td>11</td>
<td>10</td>
<td>8</td>
<td>120</td>
</tr>
<tr>
<td>7</td>
<td>Puwatu</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>8</td>
<td>Kadia</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td>46</td>
</tr>
<tr>
<td>9</td>
<td>Wua-wua</td>
<td>6</td>
<td>7</td>
<td>15</td>
<td>12</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>10</td>
<td>4</td>
<td>9</td>
<td>14</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Kambu</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</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>
<td>847</td>
</tr>
</tbody>
</table>

Table 4. Distribution of the incidence of smear positive Pulmonary Tuberculosis in Kendari Each district based on month in 2013

<table>
<thead>
<tr>
<th>No.</th>
<th>District</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mandonga</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Kendari</td>
<td>12</td>
<td>7</td>
<td>10</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>20</td>
<td>13</td>
<td>7</td>
<td>9</td>
<td>12</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>Baruga</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>13</td>
<td>20</td>
<td>15</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>3</td>
<td>111</td>
</tr>
<tr>
<td>4</td>
<td>Poasia</td>
<td>2</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>56</td>
</tr>
<tr>
<td>5</td>
<td>West Kendari</td>
<td>10</td>
<td>13</td>
<td>18</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>15</td>
<td>12</td>
<td>10</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>120</td>
</tr>
<tr>
<td>6</td>
<td>Abeli</td>
<td>18</td>
<td>15</td>
<td>17</td>
<td>15</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>11</td>
<td>14</td>
<td>12</td>
<td>7</td>
<td>15</td>
<td>147</td>
</tr>
<tr>
<td>7</td>
<td>Puwatu</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>8</td>
<td>Kadia</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>9</td>
<td>Wua-wua</td>
<td>41</td>
<td>48</td>
<td>35</td>
<td>43</td>
<td>50</td>
<td>35</td>
<td>51</td>
<td>47</td>
<td>39</td>
<td>24</td>
<td>17</td>
<td>39</td>
<td>469</td>
</tr>
<tr>
<td>10</td>
<td>Kambu</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Total</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>
<td>1228</td>
</tr>
</tbody>
</table>

Figure 1: Temporal description of smear positive Pulmonary Tuberculosis Case in Kendari from 2011 to 2013
The data from 2012 (Table 3) reveal the highest number of incidence of the smear positive Pulmonary Tuberculosis cases was in April with incidence as many as 20 cases or 7.9% in West Kendari district. From the graphic above obtained information that occur increasing trend from January to April, the increasing may be affected by the number of encompass suspects that increase as well at the similar month then there is insignificant decreasing cases from May to December in West Kendari district.

The data from 2013 (Table 4) reveal the highest number of incidence of the smear positive Pulmonary Tuberculosis cases was in July with incidence as many as 51 cases or 4.6% in Wua-Wua district. The increasing may be affected by the number of encompass suspects that increase at that time.

**DISCUSSION**

**Spatial description**

Tuberculosis (TBC or TB) is an infectious disease caused by bacteria *Mycobacterium tuberculosis*. The cause of this disease is the bacterial complex of Mycobacterium tuberculosis. Mycobacteria belongs to the Mycobacteriaceae family and belongs to the order of Actinomycetales. The Mycobacterium tuberculosis complex includes *M. tuberculosis*, *M. bovis*, *M. africanum*, *M. microti*, and *M. canetti* of the several complexes, *M. tuberculosis* is the most important and most common type. This bacterium is a very strong bacillus bacteria that require a long time to treat it. These bacteria more often infect the pulmonary organ (90%) than other parts of the human body.7-9

A densely populated region causes increased transmission of disease, therefore Pulmonary Tuberculosis cases are more common in densely populated urban areas and have high mobility10. Based on the above graph shows that the incidence rate of smear positive Pulmonary Tuberculosis cases in Wua-Wua District for 2011 is 115 cases or 22.9% and in 2012 the number of cases smear positive Pulmonary Tuberculosis cases in Kendari Barat District as many as 253 cases or 29.8% and in the year 2013 the incidence rate of smear positive Most Pulmonary Tuberculosis cases in Wua-Wuadistrict was 469 cases or 38.3%. Population density is also close to the distance between homes.

Based on the results of the spatial analysis, the areas where Pulmonary Tuberculosis is found are Wua-Wua and West Kendari districts, this is because the temperature and humidity in the area is quite high, with conditions such as temperature and humidity are very supportive to grow and the development of mycobacterium tuberculosis.11

**Temporal description**

The temporal picture is a time-based study13. The study describes the incidence of pulmonary tuberculosis illustrated on the basis of the month, ie seeing the month with the incidence of Tuberculosis Pulmonary most in Kendari City.

Based on the description of the case of Tuberculosis Pulmonary smear positive The data obtained from the highest case was in June 2011 which was 15 cases, while in 2012 the highest case was in April that was 20 cases and in the year 2013 the highest case was in July that was 51 case. While the case of Tuberculosis Pulmonary smear positive The most is in the year 2013 as many as 1228 cases, it could be influenced by the number of suspect that also increased in that year.

**CONCLUSION**

The conclusion of this study is the finding of smear positive Pulmonary Tuberculosis cases from 2011 to 2012 was in low category with the number of finding percentage range between 0-35% for all districts in Kendari meanwhile in 2013 the finding of smear positive Pulmonary Tuberculosis cases occur in populous districts that is Wua-Wua district with the number of finding cases range between 36-69% with medium category, the highest pulmonary tuberculosis case was in June 2012, meanwhile in 2012 the highest cases was in April an in 2013 the highest cases was in July. And the highest increasing of TB cases occur in 2013 as many as 1228 cases.

**Conflict of Interests:** There are no conflicts of interests.
Source of Funding: STIKES Mandala Waluya Kendari

Ethical Clearance: Obtained from University Committee

REFERENCES

3. WHO. Bending The Curve ending TB. 2017
5. Provincial Health Office of Southeast Sulawesi. Health Profile of Southeast Sulawesi. 2013
Analysis of Quality of Life among Patients with Diabetes Mellitus in Elderly People in Wua Wua Health Centre

Rahmawati¹, Titi Saparina L¹, Ridia Utami Kasih¹, La Djabo Buton¹, Sri Mulyani¹

¹STIKES Mandala Waluya Kendari, Indonesia

ABSTRACT

Objectives: Knowing the factors that risk to diabetes mellitus elderly patients’ quality of life such as: level of anxiety, complication, family support and length of suffering.

Method: The research design used was retrospective cohort with 73 people sample size. The sampling technique used was consecutive sampling. Statistical test used was RR (Relative Risk). Results: The results showed that there were not significant risk factors to the quality of life of patients with diabetes mellitus on the elderly. They are described clearly as follows; the level of anxiety (RR = 1.072; 95% CI: 0.751 - 1.532) and diabetes mellitus complications (RR = 1.009; CI: 0.0572-1,781) and length of suffering (RR = 1.015; 95% CI: 0.711-1.447).

Conclusion: Based on the results of the research that the factors of anxiety, complications of Diabetes Mellitus and length of suffering were risk factor but not significant. This is because the percentage of patients with complications who have bad quality of life almost similar as those who have complications and have a good quality of life. In addition, because of the behavior of positive adaptation refered to coping mechanism, taskoriented and self-defense mechanism (ego oriented).

Keywords: Diabetes Mellitus on Elderly, Quality of Life, Anxiety, Complication, Length of Suffering

INTRODUCTION

Diabetes Mellitus (DM) is one of the health problems that affect productivity and can decrease Human Resources. This disease not only affects individuals, but the health system of a country. Although there has not been a national survey, in line with changes in lifestyle including the Indonesian diet it was estimated in Diabetes Mellitus patients more increasing, especially in the adult age group of all socioeconomic status. Currently, Diabetes Mellitus prevention efforts have not occupied the main priority scale in health services, although it has been known that it has a considerable negative impact such as chronic complications in chronic heart disease, hypertension, brain, nervous system, liver, eyes and kidneys.¹

In 2000, the number of Diabetes Mellitus sufferers in the world were around 171 million and were predicted to reach 366 million in 2030. In Southeast Asia there are 46 million and estimated to increase to 119 million people.

In Indonesia from 8,4 million in 2000 it was estimated to be 21,3 million by 2030². Epidemiologically, it has been estimated that in 2030 the prevalence of Diabetes Mellitus (DM) in Indonesia reaches 21.3 million people³. While results of Basic Health Research (Riskesdas) in 2007, obtained that proportion of causes of death due to DM in the age group 45-54 years in urban areas ranked 2nd place-14.7%. And rural areas, DM ranked 6th place with 5.8%⁴.

Quality of life is a perception of a person about his health condition which affects the health generally in implementation of the role and physical function and body condition⁵.

Problems on the quality of life of Diabetes Mellitus patients were a fairly complex problem. This is because it will affect some aspects of life. Another study conducted by Gautam et al. (2009) was obtained the result that DM disease gave an unfavorable effect on the quality of life. The low quality of life is also related to socioeconomic,
Several studies conducted in developing countries and developed countries showed that DM has a strong negative impact on quality of life. According Faddda and Jiron the factors that affect the quality of life are depression, anxiety, complications, family support and length of suffering.

The research of Salcha M. Akbar showed that factors significantly risking the quality of life of type II diabetes mellitus patients were anxiety levels (RR = 1.595; CI 95%: 1.092 - 2.329), family support (RR = 1.724; CI: 1.160 - 2.564). In addition,According to Hedrianti’s (2013) showed that factors that contribute greatly to the quality of life of patients with type 2 diabetes mellitus were length of suffering (p = 0.004, RR: 7.425) and complications (p: 0.000 RR: 8.125).

According to Rubin, patients who have suffered from Diabetes Mellitus for five years have a risk to get a bad quality of life, this is due to physical limitations experienced by people with diabetes mellitus so that it affected them psychologically. In addition, the complications experienced during suffered diabetes mellitus also played an important role in the physical decline of people with diabetes mellitus.

MATERIALS AND METHOD

This study used a retrospective cohort or cohort design. Total number of population were 273 people and the sample size were 73 people. The sampling technique in this research was conducted with non-probability sampling technique with consecutive sampling type. This research was carried out at Wua–Wua health centre,Kendari. Data analysis were divided into two stages of analysis, they were univariate and bivariate analysis. The statistic test used was relative risk (RR).

RESULTS

Characteristic of respondents

Age

Based on the finding of research indicated that from 73 respondents, the highest age group has been found in group of age 45 - 50 years old with 23 respondents (31.5%) and the lowest age group has been found in group of age 73 - 78 which equaled to 1 respondent (1.4%).

Sex/Gender

Based on the finding of the research showed that from 73 respondents, there were 49 male respondents (67.1%) and 24 female respondents (32.9%).

Univariate Analysis

Table 1. The frequency distribution of respondents is based Quality Of Life, Anxiety, Diabetes Mellitus’ Complication, Length of Suffering In Wua-Wua Health Centre, Kendari

<table>
<thead>
<tr>
<th>Variabel</th>
<th>n (73)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bad</td>
<td>46</td>
<td>63.0</td>
</tr>
<tr>
<td>Good</td>
<td>27</td>
<td>37.0</td>
</tr>
<tr>
<td>Anxiety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>positive exposures</td>
<td>40</td>
<td>54.8</td>
</tr>
<tr>
<td>negative exposure</td>
<td>33</td>
<td>45.2</td>
</tr>
<tr>
<td>Diabetes Mellitus’ Complication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>positive exposures</td>
<td>65</td>
<td>89.0</td>
</tr>
<tr>
<td>negative exposure</td>
<td>8</td>
<td>11.0</td>
</tr>
<tr>
<td>Length of Suffering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>positive exposures</td>
<td>41</td>
<td>56.2</td>
</tr>
<tr>
<td>negative exposure</td>
<td>32</td>
<td>43.8</td>
</tr>
</tbody>
</table>

Based quality of life category on table 1 shows that from 73 respondents, there were 46 respondents (63.0%) which categorized as bad quality of life while there were 27 respondents (37.0%) categorized as good quality of life.

Based on table 1 shows that from 73 respondents with different level of anxiety, there were 40 respondents (54.8%) which had positive exposures while the negative exposures were 33 respondents (45.2%).

Based on table 1 shows that from 73 respondents with Diabetes Mellitus’ complication. There were positive exposures equal to 65 respondents (89.0%) which categorized as the highest number while negative exposure equal to 8 respondents (11.0%) which
Based on table 1 shows that from 73 respondents according to length of suffering category, there were positive exposures with 41 respondents (56.2%) while negative exposures were 32 respondents (43.8%).

Table 2. Risk analysis anxiety, diabetes mellitus' complication, length of suffering towards the quality of life of elderly diabetes Mellitus patients in wua-wua health centre, kendari

<table>
<thead>
<tr>
<th>Variable</th>
<th>Quality Of Life</th>
<th>Total</th>
<th>RR 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bad</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive exposures</td>
<td>26</td>
<td>65.0</td>
<td>14</td>
</tr>
<tr>
<td>Negative exposure</td>
<td>20</td>
<td>60.6</td>
<td>13</td>
</tr>
<tr>
<td>Diabetes mellitus’ complication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive exposures</td>
<td>41</td>
<td>63.1</td>
<td>24</td>
</tr>
<tr>
<td>Negative exposure</td>
<td>5</td>
<td>62.5</td>
<td>3</td>
</tr>
<tr>
<td>Length of suffering</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive exposures</td>
<td>26</td>
<td>63.4</td>
<td>15</td>
</tr>
<tr>
<td>Negative exposure</td>
<td>20</td>
<td>62.5</td>
<td>12</td>
</tr>
</tbody>
</table>

Based on table 2 shows that from 40 respondents, positive exposures category towards bad quality of life were 26 respondents (65.0%) While from 33 respondents, negative exposures category towards bad quality of life were 20 respondents (60.6%). Based on statistical test results, it was known that anxiety is a risk factor for the quality of life of DM patients with RR = 1.072 (95% CI: 0.751 - 1.532), which means anxiety have risks 1.072 times for patients to get bad quality of life.

Based on table 2 shows that from 65 respondents of diabetes mellitus complication, category of positive exposures towards bad quality of life were 41 respondents (63.1%). While from 8 respondents of diabetes mellitus complication, category of negative exposure towards bad quality of life were 5 respondents (62.5%). Based on statistical test results, it is known that complication of diabetes mellitus is a risk factor for the quality of life of DM patient with RR = 1.009 (95% CI: 0.572 - 1.781), which means complication of diabetes mellitus have risks 1.009 times to patients to get bad quality of life.

DISCUSSION

Anxiety Risk Analysis of The Quality of Life of Elderly Diabetic Mellitus Patients

Based on the univariate analysis, this is due to one of the factors namely age, where the age of the patient is elderly. Elderly often experience a sense of anxiety with the surrounding situation so that it can cause panic in themselves.

Based on bivariate analysis that who experienced...
anxiety with category of positive exposure to bad quality of life were 26 people (65.0%) from 40 people. This is caused by an elderly patient often experienced anxiety disorder where DM patient suffered increase of stomach acid besides the occurrence of disturbances of gastrointestinal contractions and reduce the secretion of digestive enzymes and disruption of blood flow to the digestive system, so that the effect to the stomach will feel heartburn, cold sweat, hard to concentrate and strained. The disturbances of gastrointestinal contractions also is related to child feeding practices.

Based on statistical test results, anxiety occurs because of the lack of appropriate management to the disease, high costs of treatment, constraints due to length of illness, high risk of death, the consequences of treatment regimens, and varying complications from mild to severe, associated with lack control of blood sugar level, and increase the risk of coronary disease.

Anxiety in Diabetes Mellitus patient physically can cause psychosocial problems that occur in patients themselves and families. Many anxieties occurred in people and family members who suffered chronic or genetic disease in diabetes mellitus with complications that can cause amputation. Causes physical disability and requires considerable treatment. diabetes mellitus requires attention towards diet, activity and treatment. Ignorance about diabetes mellitus will further increase the emotionality of patients associated with relationships with others. This will increase anxiety and change everything in life (Ini, 2009). Psychological elements related to the perception of the patient about the threat and stress caused by diabetes mellitus, this perception will be different for each individual, the problem of diabetes mellitus is the threat of diabetes mellitus itself then become acute and chronic complications.

The results of the study were not in line with those conducted by which indicating that risk of anxiety were 5.981 times experienced by patients with type 2 diabetes. In line with other research conducted showed that risk anxiety experienced by patients DM type 2 were 2,774 times.

Complications of Diabetes Mellitus towards the Quality of Life of Elderly Diabetic Mellitus Patients

Based on the univariate analysis, complications of diabetes mellitus with positive exposure were 65 people (89%) and negative exposure were 8 people (11.0%) this is because before people with diabetes mellitus suffered that disease, patients suffered other diseases such as hypertension and cholesterol. Where those diseases triggered diabetes mellitus. After suffering diabetes mellitus another illness arose one of them was rheumatism.

Based on bivariate analysis, complications of diabetes mellitus with positive exposure towards bad quality of life were 41 people (63.1%) this is because more and more of complication disease suffered by patient of diabetes mellitus so that caused chronic condition that harm if not treated. As a result of hyperglycemia can occur acute metabolic complications such as Diabetic Ketoacidosis (DK) and long-term hyperglycemic conditions contribute to chronic complications in cardiovascular, kidney, eye disease and neuropathic complications. Diabetes mellitus is also related to increase the incidence of macrovascular disease such as MCI (miocard infarction) and stroke. This will have an effect on the quality of life of the patient. Decreasing of quality of life has a significant relationship to morbidity and mortality and affects the life expectancy of people with diabetes mellitus.

Based on the results of the analysis, it was found that diabetes mellitus complications were risk factors of quality of life for DM patients with RR = 1,009 (95% CI: 0.572 - 1,781), which means diabetes mellitus is at risk 1.009 times to patients to achieve bad quality of life. Experienced complication caused the physical, psychological and social limitation. Impaired function and changes will affect the quality of life of patients with DM.

The results of this research indicated that complications are not statistically related to the quality of life of DM patients. It was showed from the percentage between patients with complications having a bad quality of life almost the same as those who have complications and have a good quality of life. The results of this research were contrast with which conducted by which stated there was a significant relationship between DM complications such as hypertension, cataracts, gangrene, sexual disorders which became risk factors for the decreased quality of life of DM patients.

This research is in line with research of at RSUD LabuangBaji and RSU lbnuSina, Makassar 2015. He stated that disease complications were risk factor to
quality of life of patient with type 2 diabetes mellitus with RR = 1.254; 95% CI: 0.717-2.195.

Length Suffering to the Quality of Life of Elderly Diabetic Mellitus Patient

Based on univariate analysis, length of suffering with positive exposure category were 41 people (56.2%) and negative exposure were 32 person (43.8%) this is because diabetes mellitus is chronic disease and it was suffered by elderly where patients have long suffered and some even suffered before the elderly.

Based on bivariate analysis, length of suffering with positive exposure category to bad quality of life were 26 people (63.4%) from 41 person this is caused by majority length of suffering of DM patients were above 5 years which greatly affected the psychological condition of patient. In addition, disease complication factors will affect physical condition of the patient. The specific causes and pathogenesis of each type of complication are still being investigated, but elevated blood glucose levels appear to play role in process of neuropathic abnormalities, microvascular complications and as risk factors of macrovascular complications. Long-term complications occured in type I and II diabetes.

Long duration of the disease and the process of treatment will make changes in patterns of social interaction and dietary so that tendency of DM patients will isolate themselves from the surrounding environment. Research of M. Akbar Salcha at RSUD Labuang Baji and RSU Ibnu Sina, Makassar in 2015. He stated that length of suffering is a risk factor to the quality of life of people with diabetes mellitus type 2 with value RR = 1.009; 95% CI: 0.695-1.465).

CONCLUSION

Based on the results of research that the factors of anxiety, complications of Diabetes Mellitus and length of suffering were risk factor but not significant. This is because the percentage of patients with complications who have bad quality of life almost similar as those who have complications and have a good quality of life. In addition, because of the behavior of positive adaptation referred to coping mechanism, task oriented and self-defense mechanism.

Conflict of Interest: The authors have no conflict of interest associated with the material presented in this paper

FUNDING

This work was supported by Mandala Waluya Foundation

Ethical Clearance- Taken from campus committee

REFERENCES


Legal Protection for Independent Midwife for Using Ultrasonography in Wonosobo Regency

Toto Surianto S¹, Dwi Erna Widayanti²

¹STIKES Mandala Waluya Kendari, Indonesia, ²Health Department of Wonosobo Regency, Indonesia

ABSTRACT

Aim: This study is aimed to identify and analyze the legal implication of independent midwife for using ultrasonography (USG) in criminal, civil, and public administration. It will also find out the attempt of the Wonosobo Indonesian Midwives Association (IMA) in providing law protection to the independent practice midwives in USG using. Method: This research is an empirical normative. The data are collected with field and literature research. The respondents of this research are independent midwives in Wonosobo who use USG. The informants of this study are Wonosobo Chief Medical Officer, the Wonosobo Head of Health Department of Health Services, the Wonosobo Chairman of IMA, the gynecology obstetrics, and the Setjonegoro Hospital radiologists; and Setjonegoro, the Wonosobo regional public hospital which provides information and solution for the research’s problems. The data obtained are then qualitatively analyzed. Results: The research result shows there is no apparent rule of the midwives’ authorities in using USG in parental care, in which they will be administratively prosecuted and accused, civilly or criminally. The 15th Congress of IMA in 2013 allows midwives to use USG with limited authority, namely to diagnose obstetrics. However this decision is not followed by IMA with rules which will provide law protection for the midwives in using USG. Conclusion: 1) there is not apparent rule yet of the midwives’ authorities in using USG in parental care; 2) The decision of IMA allows midwife to use USG is not followed with regulation for the USG using by the independence practice midwives.

Keywords: Independent midwives, legal protection, ultrasonography

INTRODUCTION

Health is a human right and one of the prosperity elements which has to be established as the Indonesian goals as mentioned in the opening of 1945 constitution. The society’s health enhancement to optimal level is established with health attempts by means of maintenance approach, health promotion, disease prevention, disease treatment, and health rehabilitation which is applied comprehensively, integrated, and sustainability. These health service attempts is established by health workers with minimal authority and qualification. According to Law Number 36 of 2014, health workers have important role in enhancing maximal health service for the society. Therefore society will be able to improve awareness, will, and ability to live a healthy life and achieve the highest health level as the investment for productive human resource development in social and economic term, and also as an element of society prosperity as mentioned in the Opening of 1945 Constitution Republic Indonesia.

Health workers have to have minimal qualification and skill in her/ his area of expertise in providing health service; and for certain workers have to have permitted of government.

Health knowledge and technology is developing rapidly. For example is ultrasonography as a radiology service. Radiology service is a medical service which uses radiation energy modal for diagnosis and therapeutic, including radiation emission use and imaging with x-ray, radioactive, ultrasonography, and electromagnetic frequency radio radiation.³

Ultrasonography is needed in health services, Because it helps in differentiating endometrium cancer from benign diseases in bleeding postmenopausal endometrial bleeding⁴ can detect intrauterine benign focal pathological mass lesions such as polyps and measure endometrial thickness (ET) in patients with or without abnormal uterine bleeding (AUB)⁵ well
recognized diagnostic categories, based on histological or gross differences about leiomyomas of the uterus; can detect subtle changes in the endometrium and can contribute to a correct pathology of endometrial malignancy in women with postmenopausal bleeding.

Midwife is a health worker who provides health service with strategic and important role in reducing Maternal Mortality (AKI) and; Infant Morbidity and Mortality (AKB). Midwives provide sustainable and plenary midwifery service. It will focus on prevention, companionship promotion and society empowerment aspects with other health workers to always service to whoever, wherever, and whenever. Midwifery as practiced by certified nurse-midwives and certified midwives encompasses a full range of primary health care services for women from adolescence beyond menopause. These services include primary care, gynecologic and family planning services, preconception care, care during pregnancy, childbirth and the postpartum period, care of the normal newborn during the first 28 days of life, and treatment of male partners for sexually transmitted infections. The growth of midwifery supported by published research that demonstrates midwifery care is associated with high-quality and is comparable or in some studies, better outcomes than care provided by obstetrician/gynecologists.

Midwives in providing health services such as care during pregnancy, childbirth and the postpartum period, require ultrasonography. The 15th Indonesia Midwives Association (IMA) Congress in 10-16 November 2013 at Grand Sahid Jaya Hotel Jakarta decided the midwives allow to use USG with limited midwives competence. The USG results however will not be allowed to be diagnosed by the midwives expect to find the fetus position. This IMA statement is supported with regulation to provide legal protection for the midwives in using USG.

**MATERIAL AND METHOD**

**Research Type:** This research is an empirical normative legal research with primary and secondary data as data resource. It uses normative legal approach (law seen as norm or das sollen) since its problems are legal matters especially health law which relates to independence practice midwives in USG using. The researcher used empirical legal approach due to secondary data use besides primary data use to find out the using of USG by the independence practice midwives in Wonosobo Regency and solve the problems.

**Research Material:** Research material in this research consists of primary and secondary data. The primary data is gained of the research subject with field research. The primary data is collected of the respondents and resources’ interviews.

The secondary data is collected of the bibliographies with bibliographies studies namely regulations and research related books. The collected secondary data consists of primary, secondary, and tertiary law materials.

- a. The research’s Primary Legal Materials are:
  1) 1945 Constitution of Republic Indonesia
  2) Law No. 29 of 2004 on Medical Practice
  3) Law No. 36 of 2009 on Health
  4) Law No. 36 of 2014 on Health Workers
  5) Health Minister Regulation No. 780 of 2008 on Radiology Service
  6) Management
  7) Health Minister Regulation No. 1464 of 2010 on Midwives Practice Permit and Management
  8) Health Minister Decree No. 369 of 2007 on Midwifery Care Standard
  9) Health Minister Decree no. 938 of 2007 on Midwifery Care Standard.

- b. Secondary legal material consists of primary legal material’s close related materials which support the analysis and comprehend primary legal material. They consist of legal books, health books, scientific works, journals, and research works.

- c. Tertiary legal materials consists of Indonesian Great Dictionary and health dictionary.

**Research Subject and Location**

- a. The research location is Wonosobo Regency
- b. The research subject is people who able to provide explanation on the research goal namely respondents and resources. The research respondents
are four independence practice midwives in Wonosobo who use USG. The resources are the Chief of Wonosobo Health Office, the Wonosobo Health Office Head of Service Division, the chief of Indonesia Midwives Association (IMA) Wonosobo Branch, Setjonegoro Hospital Radiologist, and Obstetricians in Wonosobo.

**Research Devices**

a. Bibliographical research accomplishes with document studies. The devices are research materials inventory by using bibliographical research to gain theoretical basis, especially the study of regulations as a unity. There are also several scientific works, documents, and data which related to this research. They are noted base on the relevance to the main problem.

b. The field research is accomplished with direct interviews on respondents and resources. The research devices to gain primary data are interview’s guidance.

Research Process: The research is accomplished with four stages. First is obtaining research permit. Second is bibliographical research with secondary data collecting; namely regulation, secondary and tertiary legal materials. Furthermore is the document study. The third is field research with arranging interview’s guidance and then respondents and resources interview. The fourth is data processing and analyzing; and then compiling the research report in the form of a thesis.

Research Data Analysis: The collected research data of field and bibliographical research are analyzed qualitatively. It is a research procedure to gain analytic descriptive data.

**RESULTS**

The Implication of Ultrasonography (USG) using by the Independence Practice Midwives in Criminal, Civil, and Administration.

**State Administration Legal Implication**

The research result shows Wonosobo Local Government has established the licensing for the health workers. The Wonosobo Head of Service Division Health Office said every Wonosobo health workers who provide independence health service in Wonosobo should have practice permit.

The Wonosobo Head of Service Division Health Office said every independence practice midwives in Wonosobo should have Midwife Practice Permit (MPP). The practice permit’s requirements are based on the Health Workers Regulation and Health Minister Regulation on Midwives Practice Management and Permit. Thereof all the requirements are fulfilled the Chief of Wonosobo Health Office will issue the permit.

Base on the interview to the Chief of Wonosobo Branch IMA, IMA allows midwives to use USG with midwife limited authority. The midwife authority is USG’s use to diagnose midwifery whether there is indefinite palpate examination.

**Criminal Law Implication**

Base on the research result, the Radiologist have an opinion whether there is no regulation on USG using by the independence practice midwives. Thereof the independence practice midwives may obtain sanction base on the Article 78 Law No. 29 of 2004 on Medical Practice on medical practice which completely stated “Whoever use devices, methods or in other ways services the society with the impression as physician or dentist with physical or dentist medical license or other license as mentioned in Article 73 verse (2) will be punished the longest imprisonment of 5 (five) years and highest fine of Rp.150.000.000,- (one hundred and fifty millions rupiahs).”

According to the chief of IMA the USG using by midwives is not a violation act because the device is use for early detection. Therefore, whether there is a pregnancy’s abnormality the midwife suppose to contact the obstetrics. Thereof the independence practice midwives who practice in rural area will actually need to use USG.

**Civil Law Implication**

The respondent’s interview shows there is no damage report due to USG using. Therefore the USG using by the independence practice midwives is not damaging and does not include in against civil legal action.

**Wonosobo Branch Indonesia Midwives Association’s Attempts to Provide Legal Protection for the Independence Practice Midwives in Using Ultrasonography**

The IMA Chief said the training for USG using by the independence practice midwives is the remainder to evade the authority cross-limited actions. Whether
there is self mistake due the independence practice midwives in using USG, the responsibility is going for the midwives.

**DISCUSSION**

**The Implication of Ultrasonography (USG) using by the Independence Practice Midwives in Criminal, Civil, and Administration.**

Health Law is a regulation with direct connection to the health service provision and its related implication to the civil law, public administration law, and criminal law. This regulation not only consists of international regulation, customary law, and jurisprudence law but also knowledge and bibliographies as legal source.\(^1\)

**State Administration Legal Implication**

Indonesia is a state with decentralization principle in its governance. It is mentioned on Article 18 verse (1) 1945 Republic of Indonesia Constitution “The division of the territory of Indonesia into major and minor units and structure of administration thereof shall be established by legislation.”

One of the government affairs which become local regency/ city government’s affair according to Indonesian Health Ministerial Decree No. 922/Menkes/Sk/X/2008 on Technical Guidelines of Government Health Affairs Division of the Government, Province Local Government, and Regency/ City Local Government is issuing Practice Permit and Working Permit for the health Workers with STR.

Then, every health worker including midwife in practicing health service is done in accordance with the area of expertise, this is mentioned in the Article 62 verse (1) Law No. 36 of 2014 on Health Workers, that health workers in practicing health service limited with their authority base on their competence.

Every health worker in practicing health service should provide health service as their professional standard, professional service standard, operational procedure standard, professional ethics, and the health consumer’s need.\(^1\)

Independence practice midwives USG using has not yet supported with a regulation to manage their authority. Therefore it will risked the independence practice midwives in getting administrative sanction orally, writing admonition, administrative fine, and/ or revoked permit.

**Criminal Law Implication**

Law basis “Nullum delecticum nulla poena sine praevia legi poenali” which means there is no delict or criminal without initial criminal provision. The legality basis in law is provided in Article 1 verse (1) Code of Criminal Justice (CCJ): “an act could not be punished except base on the available criminal provision power.”

Is the USG using by the independence practice midwives a criminal law action which also calls delict criminal action? An action may identify as law action whether it is fulfilled the requirements.\(^12,13\) It is an action which supposes to follow provision, accountably fault proved, against the law, and punishment.

Article 18 Code of Criminal Justice (CCJ) stated every criminal act will always against the regulation or law except if there is forgiveness or justification. USG using by the independence practice midwives is supposed to early detect any pregnancy abnormalities and not against the material law. It is a justification device beside CCJ to remove the against law nature.

**Civil Law Implication**

The midwife and patient therapeutic may interpret as midwife and patient legal relation in professional midwifery service base on the competence at certain health expertise and skill. Article 1234 Code of Civil Justice stated “every relation will give something, for something, or do not do anything.” Base on the statement, the relation of midwife and patient is not embodied in power or skill.

The civil stated an action will against the law whether it has an element of an action which against the law, the fault of the perpetrator, harming the victims, and a casual relationship of action and damage. Base on Article 1365 Code of Civil Justice stated a legal suit is possible whether there is damage (schade).

**Wonosobo Branch Indonesia Midwives Association’s Attempts to Provide Legal Protection for the Independence Practice Midwives in Using Ultrasonography**

The reason IMA allowing independence practice midwives using USG is the palpate technique ability
to diagnose fetus is very limited. IMA also follows the Article 18 verse (2) of Health Minister Regulation No. 1464 of 2010 on Midwives Practice Permit and Management. It stated the midwives obligation in their practice is always enhancing their services following knowledge and technology development with education and training as their profession. Legal protection for the health workers is provided by the Article 27 verse (1) Law No. 36 of 2009 on Health which stated health workers are allowed to receive reward and legal protection as they in their profession. The regulation of independence practice midwives in using USG has not yet issued, therefore legal protection for them in USG using has not yet available.

A concrete legal regulation is needed by the independence practice midwives as a legal protection in using USG. The regulation is supposed to be written with obvious and limit scope.

**CONCLUSION**

Base on the research and discussion the conclusions are:

There is no regulation for ultrasonography using by the independence practice midwives. It will caused administration, criminal, and civil in legal implication.

Administratively, the independence practice midwives are risked getting sanction base on Article 82 Law No. 36 of 2014 on Health Workers sanctions are oral warning, written warning, administrative fine, and/or revoked permit.

Criminally, the independence practice midwives may subject to Article 78 Law No. 29 of 2004 on Medical Practice whether there is a legal suit of the physician on USG using thereof it is a device or method of physician’s authority.

Out of standard in USG using will inflict damage. The damage will be able to be sued base on Article 1365 Code of Civil Justice.

The Indonesia Midwife Association (IMA) allows midwife to use USG. This decision is not following with regulation for USG using by the independence practice midwives. Responsibility on suit or claim on the USG using by the midwives out of their authority will be their responsibility.

**Conflicts of Interest:** Author declare that no any conflict of interest on this research and publication including on funding.

**Source of Funding:** The funding came from College of Health Sciences Mandala Waluya, Kendari.

**Ethical Clearance:** Taken from campus committee

**REFERENCES**

with woman, for a lifetime.


The Relation between Knowledge, Stress and Salt Consumption with Incidence of Hypertension in Elderly Woman Out Patients in General Hospital of Bahteramas Southeast Sulwesi Province

La Djabo Buton¹, Fitri Rachmillah Fadmi¹, Rahmawati¹, Sri Mulyani¹, Noviati¹

¹Public Health Studies Program, College of Mandala Waluya Kendari Health Science, Kendari, Southeast Sulawesi Province, Indonesia

Hypertension is often referred to as a dark killer (Silent Killer), because it includes a deadly disease without accompanied by its symptoms first as a warning to the victim. Various factors associated with hypertension in the elderly such as knowledge, stress and salt consumption. Prevalensi national intake in the age group ≥60 years reached 29%. The purpose of this study was to determine the relationship of knowledge, stress and salt intake with the incidence of hypertension in elderly women outpatient at Bahteramas General Hospital Southeast Sulawesi Province. The type of this research is quantitative research using Cross Sectional Study design. The population in this study were all elderly women who checked themselves in the Internal Disease Polyclinic of Bahteramas General Hospital of Southeast Sulawesi Province. The sample in this study are some elderly women who checked themselves in the room of Internal Medicine Polyclinics at Bahteramas General Hospital of Southeast Sulawesi Province with a total sample of 56 people. The results showed that knowledge (p-value = 0.000), stress (p-value = 0.000) and salt intake (p-value = 0.012) was associated with the incidence of hypertension incidence in elderly women in public hospitals outpatient Bahteramas Southeast Sulawesi Province. Therefore it is necessary to increase knowledge through counseling about hypertension along with stress risk and excess salt intake.

Keywords: Hypertension, Elderly, Knowledge, Stress, Salt

INTRODUCTION

Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. Blood is carried from the heart to all parts of the body in the vessels. Each time the heart beats, it pumps blood into the vessels. Blood pressure is created by the force of blood pushing against the walls of blood vessels (arteries) as it is pumped by the heart. The higher the pressure the harder the heart has to pump. Hypertension is one of the leading causes of premature death in the world’s population and the longer it is, the problem is increasing. WHO has predicted that by the year 2025, 1.5 billion people worldwide will suffer from hypertension each year. According to WHO, 1 in 3 people suffer from hypertension or high blood and other data say that 1 in 10 people suffering from hypertension also diabetes. Statistics released by WHO in 2012 also mentioned can trigger a stroke that causes death up to 51% and trigger coronary heart disease that causes death up to 45%. Prevalence of hypertension in Indonesia reached 31.7%¹.

Data from different national and regional surveys show that hypertension is common in developing countries, particularly in urban areas, and that rates of awareness, treatment, and control are low. Several hypertension risk factors seem to be more common in developing countries than in developed regions. Findings from serial surveys show an increasing prevalence of hypertension in developing countries, possibly caused by urbanization, ageing of population, changes to dietary habits, and social stress².

The prevalence of hypertension nationally in the age group ≥60 years reached 29% Statistical data of the central statistics agency in 2000 showed that the number of elderly population 15,054,877 people with the number of elderly women 52.42% and men 47.58%. Year 2007
shows that the number of elderly in Indonesia reached 18.96 million people. The increase in the number of elderly (elderly) in Indonesia in the period 1990 to 2025 is estimated as the world’s fastest growing elderly.

Elderly women have a higher value in terms of loneliness, low economics, and worries about a future that triggers stress. These gender differences have contributed significantly to the quality of life of the elderly. There needs to be an effort to improve the quality of life for the elderly, especially elderly women considering the life expectancy is higher and the number of elderly women more. Psychosocial changes that occur in the elderly are closely related to physical changes, the environment of residence and social relationships with society by Miller 2002 in Stanley & Beare, most elderly have decreased cognitive and psychomotor function. Cognitive functions include learning, perception, understanding, understanding, attention and others, causing the reaction and behavior of the elderly to become slower. While psychomotor function (konatif) include things related to the will of the will, such as movement, action, coordination which resulted in the elderly become less nimble. Disengagement theory states that the elderly gradually withdraw in interacting with other caring and social life. Severe psychosocial stressors such as the death of a spouse, close family death, can cause sudden psychological changes, such as confusion, panic, depression, apathy.

Several epidemiological studies have found that as age increases, blood pressure rises. Hypertension is a problem in the elderly as it is often found and it becomes more than half of deaths over the age of 60 years caused by heart disease and cerebrovascular disease. Research on factors related to the incidence of hypertension in the elderly is necessary in order to be mediated. So far, there is no research to examine various factors related to the incidence of hypertension in elderly women.

The purpose of this study was to determine the relationship of knowledge, stress and salt intake with the incidence of hypertension in elderly women outpatient at Bahteramas General Hospital Southeast Sulawesi Province

MATERILAS AND METHOD

The type of this research is quantitative research using Cross Sectional Study design, with the intention that all measurements of research variables are conducted at the same time period. The population in this study were all elderly women who checked themselves in the Internal Disease Polyclinic of Bahteramas General Hospital of Southeast Sulawesi Province. The sample in this study are some elderly women who checked themselves in the room of Internal Medicine Polyclinics at Bahteramas General Hospital of Southeast Sulawesi Province with a total sample of 56 people. Sampling is done by using simple random sampling with inclusion criteria 1) Respondent is patient of elderly hypertension of elderly woman who checked himself in the room of poly diseases in Bahteramas General Hospital of Southeast Sulawesi Province; 2) Willing to be a respondent; 3) Aged (≥60 years); 4) Visited in Bahteramas General Hospital of Southeast Sulawesi Province. Exclusion criteria: 1) Refused to participate; 2) Does not meet the standards to be examined; 3) Patients with hypertension of elderly women who are not possible to study.

In this study the dependent variable is the incidence of hypertension that occurs in the respondent and independent variables of research consisting of knowledge, stress and salt consumption. The data obtained is processed by computerized, and for the analysis of research result, it is used the mean difference test and chi-square with the meaning level p <0.05

RESULTS

Descriptive Analysis

The result of descriptive analysis showed that 56 respondents who suffer from hypertension were 43 respondents (76.8%) who did not suffer from hypertension as much as 13 respondents (23.2%), knowledgeable enough 24 respondents (42.9%), as many as 32 respondents (57.1%). Furthermore, stress experienced as many as 34 respondents (60.7%), did not experience stress as much as 22 respondents (39.3%), who consumed salt intake as much as 32 respondents (57.1%) and salt intake as much as 24 respondents (42.9%).

Inferential Analysis

Distribution of Knowledge, Stress and salt intake based on the incidence of hypertension in elderly women at Bahteramas General Hospital Southeast Sulawesi Province in table 1 below.
Table 1. Distribution of Knowledge, Stress and salt intake based on the incidence of hypertension on the previous night

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hypertension Occurrence</th>
<th>Total</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Suffering</td>
<td>Suffered</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough</td>
<td>12</td>
<td>50.0</td>
<td>12</td>
</tr>
<tr>
<td>Less</td>
<td>1</td>
<td>3.1</td>
<td>31</td>
</tr>
<tr>
<td>Stress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not experiencing stress</td>
<td>11</td>
<td>50.0</td>
<td>11</td>
</tr>
<tr>
<td>Experiencing stress</td>
<td>2</td>
<td>5.9</td>
<td>32</td>
</tr>
<tr>
<td>Salt intake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at risk</td>
<td>10</td>
<td>41.7</td>
<td>14</td>
</tr>
<tr>
<td>Risk</td>
<td>3</td>
<td>9.4</td>
<td>29</td>
</tr>
</tbody>
</table>

The results of inferential analysis showed that of 24 respondents who have enough knowledge there are 12 respondents (50.0%) who suffer from hypertension. Furthermore, from 32 respondents who have less knowledge there are 31 respondents (96.9%) who suffer from hypertension. This shows that people with hypertension are more prevalent in respondents with less knowledge. Chi Square test results obtained p-value <α, then H0 rejected means there is a relationship between knowledge with the incidence of hypertension in elderly women outpatient at Bahteramas General Hospital Southeast Sulawesi Province. Furthermore, from 22 respondents who did not experience stress there are 11 respondents (50.0%) who suffer from hypertension. Furthermore, from 34 respondents who experienced stress there are 32 respondents (94.1%) who suffer from hypertension. This shows that people with hypertension more common in respondents who experience stress. Chi Square test results obtained p-value value <α, then H0 rejected means there is a relationship between stress with the incidence of hypertension in elderly women outpatient at Bahteramas General Hospital Southeast Sulawesi Province.

DISCUSSION

Knowledge is information or information that is known or realized by someone. Knowledge has a predictive ability to something as a result of recognition of a pattern. Based on the results of research conducted in Bahteramas General Hospital of Southeast Sulawesi, respondents who have less knowledge. This is due to the low education that has an impact on the knowledge and behavior of life that is less good. While elderly who have enough knowledge but there are still 12 people (50.0%), who suffer from hypertension. This is caused by other factors causing the occurrence of hypertension but can be controlled or improved such as lack of activity, and eating patterns that are not good. Or that cannot be controlled and changed like heredity, sex, and personal health history.

Knowledge of an elderly woman is very influential on the health of these elderly women. An elderly woman who has sufficient knowledge will be able to make efforts to prevent him from various diseases, especially hypertensive diseases that threaten health. Elderly women tend to think that she is no longer fit to seek out health-related information because of their age. Yet to find out a particularly health-related information is very
important to know to extend life expectancy. Conversely, an elderly woman who has less knowledge will be very difficult to prevent the elderly women avoid diseases that threaten health\(^6\).

The result of this research is the correlation between knowledge with the incidence of hypertension.

Stress according to Hans Selye states that stress is a body response that is nonspecific to every demands of the load on it. When someone after experiencing stress has a disorder in one or more organs so that the concerned can no longer perform his job functions well, then he is called experiencing distress. In the symptoms of stress, symptoms that complained of patients are dominated by somatic (physical) complaints, but can also be accompanied by psychological complaints. Not all forms of stress have a negative connotation, quite a lot of positive ones, it is called eustress\(^7\).

Based on the results of research conducted in Bahteramas General Hospital of Southeast Sulawesi Province in 56 respondents studied there are 34 people who experience stress. This is due to several factors such as, employment, economic factors such as high cost of living, delayed loans and other general economic uncertainties. Overwork and job dissatisfaction, difficult personal relationships and the tensions of everyday life that cause disagreements and fights, lack of interest so as not to have the passion or motivation to do positive things.

While among 22 elderly women who are not experiencing stress there are still 11 respondents (50.0\%) who suffer from hypertension. This is caused by several other factors that trigger the occurrence of hypertension such as personal health history, heredity that is hypertension diseases derived from one family member for example from parents so that even though people with hypertension do not experience stress but can suffer from hypertension.

Based on the research results found there is a relationship between stress with the incidence of hypertension. This means there is a significant relationship between stress with the incidence of hypertension in elderly women outpatient in Bahteramas General Hospital of Southeast Sulawesi Province.

Based on the above description, the main cause of high salt intake is excessive consumption of salty foods. To reduce the salt intake of elderly women it is necessary to reduce the consumption of salty foods due to excessive consumption of salty foods result in increased blood pressure. the results of appropriate research\(^10-11\).

Consuming salt can increase the volume of blood in the body, which means the heart must pump more hard so that blood pressure rises. This increase results in the kidneys having to filter out more salt and water. Since the input must be equal to the output (Output) in the blood vessel system, the heart must pump stronger with higher pressure\(^13\).

**CONCLUSION**

Based on the results of research on several factors related to the occurrence of Hypertension in elderly women outpatients in Bahteramas General Hospital of Southeast Sulawesi Province can be concluded that there is a relationship between knowledge, stress and salt intake with the incidence of hypertension. This means that knowledge, stress and salt intake is the cause of the incidence of hypertension in elderly women outpatient in Bahteramas General Hospital of Southeast Sulawesi Province.
Conflict of Interest: The authors have no conflicts of interest associated with the material presented in this paper.

Ethical Clearance: Obtained from college committee.

Sourc Funding: This work supported by foundation of College of Mandala Waluya Kendari

REFERENCES


Differences Knowledge Prevention and Treatment of Diarrhea with Role Play Methods in School Age Children

Israeli, Ari Nofitasari, Asbath Said, Dewi Sari Pratiwi, Ruslan

1Public Health Studies Program, College of Mandala Waluya Kendari Health Science, Kendari, Southeast Sulawesi Province, Indonesia

ABSTRACT

Maintaining children’s health was the responsibility of parents, but now public schools and health departments have contributed significantly to improving child health. Diarrhea is an endemic disease in Indonesia and is also a potential illness of outbreaks that is often accompanied by death. In the year 2015 occurred 18 times Outbreaks of Diarrhea spread in 11 provinces data Public health Office Konawe Selatan year 2015 number of diarrhea patients 200. year 2016 number of diarrhea patient 252, year 2017 january until march diarrhea number of patient 59, the purpose of this study is to know difference of knowledge about prevention and treatment of diarrhea before and after education by method of play role at elementary school age In Primary School (SD) 03 Basala.

This type of Essay was pre experiment with one group pretest-posttest design. The population in this research was 56 people, random sampling technique technique of sampling, with 36 samples. The analysis method used Wilcoxon Sign Rank Statistics test.

The results showed that the knowledge of children before and after education with role play method occurs differently. It can be seen from the test value of knowledge statistics obtained ρ: 0,000. Therefore the value of the data was ρ <0.05 which shows a significant difference.

Based on the results of research can be concluded that education by the method of role play gives different knowledge about prevention and treatment of diarrhea in school age children.

Keywords: Knowledge, Prevention, Diarrhea Care, Education, Role Play

INTRODUCTION

Primary school children are age groups susceptible to diarrhea. However, it can be a good target in providing health education related to prevention of diarrheal events. Because school-aged children are the largest among the other age groups and most sensitive to receiving change or renewal, because the group of school children is at the stage of growth and development. So easily guided, directed and inculcated good habits, including healthy living habits considering they are an investment for nation building.

Diarrhea is an endemic disease in Indonesia and is also a potential outbreak of death, not least in Southeast Sulawesi. Based on the results of basic health research (Riskesdas) in 2013 the prevalence period of diarrhea in Southeast Sulawesi amounted to 7.3% with incidence of diarrhea in infants about 5%. in 2014 as many as 42,293 cases or as much as 81.90%, while in 2015 as many as 41,071 cases or 77.74% of the estimated cases, decreased compared to the year 2013 of 42,293 cases (81.90% of the estimated cases).

Diarrhea is a disease in which the patient experiences persistent bowel movements and feces have excessive water content. The estimated number of diarrhea sufferers coming to health facilities and cadres is 10% of morbidity per 1000 inhabitants in one work area within a year. The number of diarrhea patients found and handled in Konawe Selatan District in 2013 was 8,202 people.

Diarrhea diseases must be constantly wary because in addition to frequent outbreaks also because of its
acute and very vulnerable occur in every layer of society at all ages, especially the lower middle class which is the majority, especially in Southeast Sulawesi. The high case of diarrhea also reflects the quality of life of a community in a particular area. Provincial Health Data of Southeast Sulawesi shows that in 2012 the prevalence of diarrhea diseases in Southeast Sulawesi is 4,182 per 100,000 population, in 2013 of 2,139 per 100,000 population, and in 2014 1,753 per 100,000 population.4

Based on data from the Health Office of Puskesmas Basala in 2015 shows the number of diarrhea patients 200 people aged 1-14 years as many as 98, while aged 15 years and over 102 men, men 105 while women 95. For tahun2016 show the number of diarrhea patients 252 for children 1-14 years 100, and women aged 57 and women aged 15 years and over 152. In 2017 January to March showed the number of diarrhea patients 59 people, for ages 1-14 years 40 people, while the age of 15 years and over 19 people. Diarrhea at Basala Puskesmas almost every month included in the category of disease 10 large.5

Based on the results of a survey conducted at Basala State Primary 03 basala from 15 students, there were 11 students who had diarrhea that caused the students did not attend school and the last researcher conducted a survey there are 8 students stated not knowing related diarrhea diseases either definition, clinical manifestation, and diarrhea treatment. Observations on the condition of the school environment are not very clean, as well as the limited facilities have only 1 bathroom, no School health Unit(UKS) program and each class does not all provide a trash can, many lontong food vendors, pastries and ice in the school environment. In the break hours children - many children who play without using shoes and snacks without seeing hand hygiene after playing with his friends, the results of behavioral observations have occurred continuously.

Basala community work area there are 6 primary schools, SDN 01 Basala, SDN 02 Basala, SDN 03 Basala, SDN 04 Basala, SDN 05 Basala, SDN 06 Basala. The results of a survey conducted by a researcher that the highest school experienced diarrhea is SDN 03 Basala that is 11 students and do not have UKS program.

**MATERIALS AND METHOD**

This type of research is experimental where the design form used is pre experimental with research design (one group pre-test post-test design). Before doing role play in school-aged children first the researchers measure knowledge about diarrhea. The tool used is a questionnaire sheet. Education with role play method here is role playing with theme scenario of diarrhea case occurrence at schoolchild at SD 03 Basala. Which is held for 2 weeks, with a frequency of 30 minutes and several stages:

a. Heating
b. Setting the stage
c. Play a role
d. Discussion and evaluation.

With role playing activities (role play) this will make students more pervasive acquisition.

**RESULTS**

Characteristics of respondents by univariate analysis, which referred to in this study is age and gender.

Based on Child Age

Based on the research results can be seen the age group of respondents in the following table:

<table>
<thead>
<tr>
<th>No</th>
<th>Age</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5-7</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>2</td>
<td>6-10</td>
<td>23</td>
<td>63.9</td>
</tr>
<tr>
<td>3</td>
<td>11-13</td>
<td>12</td>
<td>33.3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>36</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Primery Data 2017

Based on the age of 36 respondents, the age of 5 - 7 was 1 respondent (2.8%), age 8-10, 23 respondents (63.9%), age 11 - 13, 12 respondents (33.3%).

**b. Based on Gender**

Based on the research results can be seen the gender group of respondents in the following table:
Table 2. Distribution of Respondents by Gender of Children

At SD 03 Basala Konawe Selatan Distric 2017

<table>
<thead>
<tr>
<th>No</th>
<th>Gender</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>20</td>
<td>55.6</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>16</td>
<td>44.4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>36</td>
<td>100</td>
</tr>
</tbody>
</table>

Source : Primery Data 2017

Based on the type of gender from 36 respondents there are 20 respondents (55.6%) male and 16 respondents (44.4%) are female sex.

Univariate Analysis

Univariate analysis was done on the research variable that is independent variable that is knowledge about prevention and treatment of diarrhea before (pre test) and after (post test) done Role Play for 2 weeks. Based on the results of the measurements using the questionnaire results show that Table 3

Table 3. Distribution of Respondents Based on Knowledge Before and After Role Play At SDN 03 Basala Konawe Selatan Distric 2017

<table>
<thead>
<tr>
<th>No</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mean</td>
<td>5.278</td>
</tr>
<tr>
<td>2</td>
<td>Modus</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>SD</td>
<td>1.542</td>
</tr>
</tbody>
</table>

Source : Primery Data 2017

The greatest number of average knowledge about prevention and treatment of diarrhea before role play is 5.278 with standard deviation 1.542, and the average amount of knowledge about prevention and treatment of diarrhea after role play for 2 weeks is 8.278 with a standard deviation of 0.881.

Bivariate Analysis

Distribution of statistical tests on differences in knowledge about prevention and treatment of diarrhea before and after education with role play method in school-aged children at SD 03 Basala can be seen in the table below:

Table 4. Test Statistics Normalities of different knowledge about prevention and treatment of diarrhea before and after education with role play method

<table>
<thead>
<tr>
<th>One-Sample Kolmogorov-Smirnov Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

Based on the table 5 datas the results of the test conducted normality data test knowledge about the prevention and treatment of diarrhea after Role Play education on school-aged children using Kolmogorov-Smirnov Test Statistics with a significant level set is α = 0.05 and obtained results ρ knowledge about prevention and treatment of diarrhea after Role Play education is 0.038. Therefore the data normality test after Role Play education is ρ < 0.05 then it is concluded that the distribution of data group is not normal, so the test statistic used is Wilcoxon Sign Rank Test.

Table 5: Statistical Test of differences in knowledge on prevention and treatment of diarrhea before and after education by role play method

<table>
<thead>
<tr>
<th>Statistic of Wilcoxon Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge before and after role play</td>
</tr>
</tbody>
</table>

Table 6. Test Statistics Normalities of different knowledge about prevention and treatment of diarrhea before and after education with role play method

<table>
<thead>
<tr>
<th>One-Sample Kolmogorov-Smirnov Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

Based on the results of research shows that the knowledge of children about prevention and treatment of diarrhea before being educated by the method of role

DISCUSSION

According to Rohanna and Arbianingsih, many still do not know how the diarrhea, how the treatment and prevention because diarrhea knowledge also greatly affects the incidence of diarrhea in children it is necessary ways to increase the knowledge of children about diarrhea one of them health education in school children can increase knowledge about health significantly. Results revealed that children taught shapes in the guided play condition showed improved shape knowledge compared to the other groups, an effect that was still evident after 1 week. Subjective reports and objective assessment of knowledge retention measured at two different times indicating role playing simulation is an effective teaching technique.

Based on the results of research shows that the knowledge of children about prevention and treatment of diarrhea before being educated by the method of role
play with an average score of 5.278 and after being educated by the method of role play with average score of 8.278.

The result of this research is that this change is caused by factors such as education with role play method given in groups so that the receipt of information is more clear, giving education with role play method by playing drama or playing role about diarrhea incident will clarify the idea or message delivered about what to do if there is diarrhea but it can also help a friend in case of diarrhea, when the role play there are things that are exhibited the same as the questions contained in the questionnaire so that the child or the respondent can directly understand and answer post test questions with true, the information provided is needed by the respondent, so that when the role play respondents enthusiastically listen to the information delivered directly, and ask if they do not understand what has been demonstrated about diarrhea. But there is still a child respondent at the post test of knowledge is still weak where knowledge before role play got score 7 and after role play only increase 1 that is with score 8, this matter because at the time role play responder less pay attention what is exhibited and submitted by researcher , but also the level of individual knowledge is different - different so the value obtained is also different\textsuperscript{10,11}.

In the respondents who had attended the education with role play method on the prevention and treatment of diarrhea within 2 weeks at SD 03 Basala experienced different knowledge. This is evidenced by the results of research that shows the difference in average knowledge between before and after do role play education. In line with Wilcoxon Sign Rank statistical test results with significant significance has been $\alpha$: 0.05 on the knowledge before and after the role play obtained $\rho$: 0.000. Therefore, the value of the data is $\rho$ <0.05 then $H_a$ is accepted and $H_0$ is rejected, which means there is a difference of knowledge about prevention and treatment of diarrhea before and after education with role play method in school age children at SD 03 Basala Kec. Basala.

The results of this study are in line with research conducted by febriana ernawati\textsuperscript{9} indicating that health education in the form of counseling, discussion and simulation affect the level of knowledge of children about diarrhea where the score before health education is 10.85 and after health investigation score is 16,15.

**Conflict of Interest:** The authors declare that no conflicts of interest associated with the material presented in this paper.

**Source of Funding:** This work as supported by Foundation of STIKES Mandala Waluya Kendari.

**Ethical Clearence:** Obtained from College committee.

**REFERENCES**

2. Provinical Health Office of Southeast Sulawesi, 2016
5. Health Center Basala 2016
9. Kristina M. DeNeve Mary J. Heppner Role play simulations: The assessment of an active learning technique and comparisons with traditional lectures 2001
Influence of Back Massage Method to Intensity of Inpartus Active Phase Pain in the Delivery Room of Kendari City Hospital

Dewi Sari Pratiwi1, Ari novitasari1, Islaeli1, Asbath said1, Yulli Fety1, Sri Mulyani1

1Public Health Studies Program, College of Mandala Waluya Kendari Health Science, Kendari, Southeast Sulawesi Province, Indonesia

ABSTRACT

Back massage method is an emphasis on sacrum that can reduce the pain and tension of the sacroliacus joints from the posterior position of the fetus. In the normal exile in the city hospital kendari there is an increase each year where the results of previous interviews there are 5 people and 4 of them say the pain from stage I ahead of the second stage is growing. The purpose of this study was to determine whether there is an effect on the intensity of the mother inpartu active phase pain in Kendari Hospital Maternity Hospital.

The type of research used is quasi experimental design: one group pre test and post test design. Population in this research is part of Primigravida mother and Multigravida in Kendari Hospital Maternity Room as many as 55 people. The sample of 16 respondents with sampling technique is Purposive Sampling.

The result of statistical test is t value Hit 9,879> t-table 3,6 and p-value 0,000 <α 0,05 then there is influence to back massage method to intensity of mother inpartu active phase. It is known that based on result of t-paired test p value = 0,000, where the value is (p <0,05), Ho is rejected and Ha accepted, it means there is difference of mean between value before giving back massage method and after giving back massage method.

Suggestion for mother inpartu and family in order to do back massage method in order to reduce the intensity of pain at the time of delivery.

Keywords: Back Massage, Intensity of pain inpartu Kala I

INTRODUCTION

Labor is a physiological process, beginning with a contraction characterized by progressive changes in the cervix, and ending with placental birth. In the first stage of pain the perceived radiation that crosses the fundus to the back. Although the levels are different, everyone has experienced the pain, but the reaction is different, some can withstand it, some are still moaning. A mother who is facing childbirth tends to feel scared, especially in primiparous moms. But when a mother feels very scared then automatically regulate the brain and prepare the body for labor pain will be felt.

Back massage is an emphasis on sacrum that can reduce the tension of the sacroliacus joints from the posterior position of the fetus. The deep back massage method is also a massive method by treating the patient lying on his side, then the midwife or the patient’s family squeezes the sacrum area steadily with the palm of the hand, release and press again, and so on. During contraction may be emphasized on the sacrum that begins at the beginning of the contraction and is terminated after the contraction stops. Emphasis can be made with the clenched hands like a tennis ball on the sacrum where the emphasis during contraction is equal to the decrease in pain. With the emphasis of stimulating cutaneous so that it can inhibit the pain implus not to the thalamus. This is consistent with the gate control theory. Effective back pressure is performed in the 1st stage of opening.

The Impact of Labor is commonly accompanied by pain due to uterine contractions. The intensity of
pain during labor can affect the delivery process, and the well-being of the fetus. Birth pain can stimulate the release of chemical mediators such as prostaglandins, leukotrienes, thromboxane, histamine, bradykinin, P substance and serotonin, will share the stresses that give rise to secretion of hormones such as catecholamines and steroids with vasoconstriction of the blood vessels so that uterine contractions weaken. Excessive secretion of the hormone will cause impaired uteroplacental circulation resulting in fetal hypoxia.

Ananda mojokerto which aims to measure the presence or absence of pain reduction with the method of back massage in maternity mothers. Studies conducted by the National Birthday Trust on 1000 women show that 90% of women feel the benefits of relaxation and pioneering to relieve pain.

Two small-scale studies show that massage can benefit both pregnant women and women. Women who got regular massage during pregnancy experience decreased anxiety, decreased back pain, and can sleep more soundly than women who do not get a massage. Women who received a massage during labor experienced decreased anxiety, reduced pain, and shorter labor time.

Back pain is common in pregnancies with reported incidence varying from approximately 50% in the UK and Scandinavia to close to 70% in Australia. Mantle reported that 16% of women studied complained of severe back pain. In 1991 reported significant back pain. Based on the initial survey conducted in January 2016 mangkujajar village district of kembang bahulamongan district of 20 pregnant women 3rd trimester there are 75% who suffered back pain causing physical and emotional fatigue and disrupted daily activities, so the problem of this study are still many pregnant women who experiencing back pain.

Research conducted by Zahra Ghanbari, et al. 35% of respondents chose childbirth by sectiocaesaria (SC) for fear of labor pain. Birthing is the most significant source of discomfort during childbirth, resulting in a level of pain that often exceeds the limits of physical endurance.

Based on preliminary study conducted at Kendari City Hospital during the last 3 years the number of normal births in 2014 was 66 people, in 2015 was 72 people, and in 2016 there was an increase of 100 people. In the last three months (January - March) that is 2017 the number of normal deliveries as many as 55 people with multigravida as many as 37 people and primigravida as many as 18 people.

Based on the results of interviews on 5 mothers in the inpartu kala I, 4 of them have the same main complaint is pain and the other is not too feel the pain. At the time of interview on 4 of their post partum mothers said the pain from the stage I before the second stage increases.

**MATERIALS AND METHOD**

In this study, the type of research used is quasi experimental design: one group pre test and post test design. The population in this study were all mothers inpartuprimigravida and multigravida kala I at Kendari Hospital as many as 55 people. The sample is part of the number and characteristics possessed by the population. The sample in this research is partially mother of inpartu primigravida and multigravida counted 16 respondents. The sampling technique in this research is with the technique of proporsive sampling of independent variable in this research that is back massage while the dependent variable is the intensity of mother pain inpartu kala I.

**RESULTS**

**Characteristics of Respondents**

Characteristics of respondents in this study include Age, Tribe, Employment and Parity. Based on the characteristics of respondents showed that the most ages in cases of age 20-25 years as many as 11 respondents and control aged 20-25 years as many as 10 respondents, in terms of tribes showed that the group of respondents as many as 6 respondents (37.5%), 6 respondents (37.5%), bugis (3) (18.75%), Javanese as much as 1 respondent (6.25%), and the control group as many as 9 respondents (56.25%), 6 respondents (37.5%), Bugis 1 respondents (6.25%) in terms of job addressing the respondent's job the highest number of cases were IRT 11 respondents (68.75%), civil servant 1 respondent (6.25%), Sawasta 1 respondent (6.25%), and 3 respondents (18.75%), most controls were IRT as many as 12 respondents (75%), civil servants as much as 1 respondent (6.25%), private as much as 1 respondent (6.25%), and farmer counted 2 respondent (12.5%). While Parity showed that most respondent group case parity were primigravida 11 respondents (68.75%) and multigravida as many as 5 respondents (31.25%), while
majority of respondent control group were primigravida as many as 10 respondents (62.5%), and multigravida as many as 6 respondents (37.5%).

**Result of Univariate Analysis**

Before performed Back Massage Method In the experimental group based on the univariate analysis showed that before the back massage, severe pain scale (6-7) there were 14 respondents (87.5%) and for very severe pain scale (8-10) there was 1 respondent (6.25%) and for moderate pain scale (3-5) there was 1 respondent (6.25).

After Back Massage Method The experimental group showed that after back massage, moderate pain scale (3-5) had 15 respondents (93.75%), and severe pain scale (6-7) there was 1 respondent (6.25%).

**Results of Bivariate Analysis**

<table>
<thead>
<tr>
<th>Pain intensity</th>
<th>p-Value</th>
<th>α</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>0.15</td>
<td>0.05</td>
<td>Normal</td>
</tr>
<tr>
<td>After</td>
<td>2.70</td>
<td>0.05</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Table 1 above shows the results of normality test data using Kolmogrov-Somirnov test obtained p-value values before and after P-value < of α = 0.005, it can be concluded that the data normally distributed, so that paired sample t-test can be used to find out the influence of back massage method on the intensity of the mother’s pain in partu active phase.

**DISCUSSION**

Back massage method is an emphasis on sacrum that can reduce the pain and tension of the sacroiliac joints from the posterior position of the fetus. The deep back massage method is also a massage method by treating the patient lying on his side, then the midwife or the patient’s family squeezes the sacrum region steadily with the palm of the hand, release and press again, and so on.

From the result of research of univariate analysis before done back massage method on 16 respondents got 14 respondents experiencing severe pain, 1 respondent experience very heavy pain and 1 respondent experiencing of moderate pain. And after done back massage method from 16 respondents among 15 respondents experiencing moderate pain and 1 respondents had severe pain.

Table 2 above shows the test of statistical test result paired sample t-test obtained t-hit value greater than t-tab (9,879 <3.6) and P-value smaller than alpha (0.05) then H0 rejected and Ha accepted, it means there is difference of mean value before done back massage method and after done back massage method. So it can be concluded there is influence of back massage method to the intensity of mother pain in partu active phase.

<table>
<thead>
<tr>
<th>Pain Intensity</th>
<th>T</th>
<th>p-Value</th>
<th>α</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before – after Back massage method</td>
<td>2.70</td>
<td>0.05</td>
<td>0.00</td>
<td>0.05</td>
</tr>
</tbody>
</table>

From descriptive analysis before and after done back massage method there is a change where that was getting value in very heavy category become heavy and heavy become light. Then it was concluded that there was an effect on giving back massage method to inpartu mother.

In respondent number 4 there was a decrease before the back massage method got the value 5 (objectively, the client hissed, can show the location of the pain) and after the back massage method to 3 (objectively, the client hissed, can indicate the location of pain, can be described, can follow orders well). only still the category of moderate pain.

Result of statistical test show before and after done back massage method got result t.count bigger than t tabel. then there is an effect on the provision of back massage method on the mother inpartu active phase, research, “the effectivity of deep back massage in overcoming the active phase I labor pain in RSUD Tidar Magelang” using quasi experimental research method with two group design with the result that deep back
massage on mother inpartu, has the effect of overcoming severe pain and giving pleasant sensations that resist discomfort during contractions or between contractions.

From the above results, compared with Danuatmaja & Meilasari study that “the effect of massage on maternal pain during the first phase of labor is physiological delivery” mothers who get twenty minutes of massage every hour during labor will be relieved of pain. This is because the massage can release large endorphins as a pain reliever and create a feeling of comfort.

Gentle massage helps mothers feel more refreshed, relaxed in labor. The type of “Pre-Experimental Design intact-Group Comparison” study was given treatment which was then measured by posttest after administering massage in the pain level in the first active maternal mother.

Labor pain is a very worrying issue for the inpard mother, especially the primigravida mother, and usually the most commonly performed to relieve the pain is by the massage method, either by the health worker, the patient’s own family. This is not done once but it must be repeated many times.

One of the most effective methods of remedy is the massage which is a nonpharmacological method used to reduce persistent pain. The basic theory of massage is the gate control theory proposed by melzak.

The researcher assumes that the level of pain in active labor before the next stage of the respondent feel after intervention with massage method, there is a reduction of pain intensity because during labor make a woman feel anxious while undergoing latent phase until active phase at the first stage.

This is in accordance with the theory that says by doing a deep back massage, can reduce pain in labor massage is an act of control of pain and can help the mother loosen her entire body when the uterus contracts. Then the authors conclude that the results of this study indicate, there is influence on the provision of back massage method on the mother inpartu active phase. This is when viewed from the observation that the originator of pain in the respondent one physiological factor.

**CONCLUSIONS**

There is Influence Back Massage Method Against Intensity of Mother Pain Inpartu Active Phase In Maternity Room Kendari City Hospital.

**Conflict of Interest:** Author declares that know any conflict of interest on this research and publication including from funding agency.

**Source of Fundings:** Funding agency Stikes Mandala Waluya Kendari Health Science, Kendari City, Southeast Sulawesi, Indonesia.

**Ethical Clearance:** Obtained from College committee.

**REFERENCES**

5. Schott, 2013, Tehnik Massage nyeri persalinan kala 1 aktif.
11. Http://ejournal.stikesmukla.ac.id/index.php/


Knowledge and Attitude of Primary School Teacher on the Practice of Selected Food Students Containing Additional Hazardous Foodstuffs in Sdn 01 Poasia Kota Kendari

Ari Nofitasari, and Islaeli, Dewi Sari Pratiwi, Asbath Said, Sartini Risky, Sari Arie Lestari

1Public Health Studies Program, College of Mandala Waluya Kendari Health Science, Kendari, Southeast Sulawesi Province, Indonesia

ABSTRACT

Based on Data of Food and Drug Administration Southeast Sulawesi 2012, there are 49 students SMPN 1 Bondoala Konawe food poisoning. Data 2016 later show about 17 children poisoned food. The type of research uses quantitative design, with cross sectional approach. The sample in this study amounted to 56 people. Sampling with total sampling technique. The study was conducted from October to November 2017.

Based on the result of research indicate there is correlation between knowledge and attitude toward practice of food snack which contain dangerous chemicals at SDN 01 Poasia Kendari with p value = 0.000. Suggestions for the school to provide education for canteen and vendor managers and to the learners about the safety of snack foods consumed.

Keywords: Snack food of schoolchildren, food safety, food additive, teacher, knowledge, attitude.

INTRODUCTION

In the growth and brain development of children needed essential nutrients such as carbohydrates, proteins, fats, vitamins, minerals and water. School children generally spend half the time each day at school.¹

The high consumption of School Food Snacks in school children who are not followed by the application of good food production methods by food vendors has the potential to cause food safety problems such as physical hazards, chemical hazards, and microbiological hazards.

One of the problems of food security that still require problem solving is: the use of food additives for various purposes. Currently a lot of food and beverages in the process of processing using food additives (food additive) and chemicals that abused their use.² The use of food additives with doses exceeding limits can have a detrimental effect on health.³

The results of this research that substances Food coloring Rhodamin-B and methanyl yellow are widely used in household food industry products. Rhodamin-B is a chemical used for red dye in textile and plastic industries. The results of Food and Drug Administration research in 2013 showed the findings on most snacks contain Rhodamin- B.⁴

In general, some street food vendors of schoolchildren also use preserved substances, because dangerous such as borax and formalin.⁴ Borax itself can cause poisoning.⁵

Data of Food and Drug Administration Southeast Sulawesi 2012, showed as many as 49 students SMPN 1 Bondoala Konawe food poisoning. Data 2016 shows as many as 17 children poisoned food. Based on the results of laboratory testing and rapid test Food and Drug Administration Southeast Sulawesi in 2016 against some food samples containing Rhodamin-B and formalin are harmful to health.⁶ The results showed that sodium benzoate can inhibit Bacillus subtilis, B. mycoides, and e. coli, because it is capable of damaging
Food safety monitoring is conducted in an integrated manner, related to food additives used in school snack foods should require supervision from the school about food safety of school children. Teacher’s knowledge related to the selection of snack food of schoolchildren whose nutritional requirement and does not contain food additives is necessary for the students. With sufficient knowledge is expected to give a good influence on the practices and attitudes of elementary school teachers in choosing safe and healthy food.

Based on the background above, then the formulation of the problem in this study is how the knowledge and attitudes of primary school teachers to the practice of choosing food snacks containing hazardous food additives in SDN 01 Poasia.

METHOD

This research uses quantitative design, with cross sectional approach. The study was conducted from October to November 2017. The population in this study were teachers / educators at SDN 01 Poasia, amounting to 56 teachers. The sample in this study amounted to 56 teachers. Sampling with total sampling technique is sampling as a whole at research location. Independent variables in this study are knowledge and attitude while the dependent variable is the selection of snack foods containing harmful food additive.

RESULTS

Characteristics of respondents

Characteristics of respondents in this study covers the working period of respondents.

Table 1. Distribution of Respondents by Period of Work

<table>
<thead>
<tr>
<th>Period of Work (years)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 10</td>
<td>15</td>
<td>26.8</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>41</td>
<td>73.2</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on table 1 above, shows, as many as 15 people (26.8%) respondents with a working period of 10 years and as many as 41 respondents (73.2%) respondents with tenure> 10 years.

Result of Univariate Analysis

Table 2. Distribution of Respondents by Knowledge

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less</td>
<td>16</td>
<td>28.6</td>
</tr>
<tr>
<td>Good</td>
<td>40</td>
<td>71.4</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on the results of univariate analysis in table 2 shows, as many as 16 respondents (28.6%) have less knowledge and 40 respondents (71.4%) have good knowledge about school food snacks containing dangerous food additive.

Table 3. Distribution of Respondents by Attitude

<table>
<thead>
<tr>
<th>Attitude</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less</td>
<td>17</td>
<td>30.4</td>
</tr>
<tr>
<td>Good</td>
<td>39</td>
<td>69.6</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100</td>
</tr>
</tbody>
</table>

While based on attitude variable in table 3 shows, 17 respondents (30.4%) have less attitude and 39 respondents (69.6%) have good attitude about snack food of schoolchildren containing dangerous food additive.

Table 4. Distribution of Respondents by Practice

<table>
<thead>
<tr>
<th>Practice</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less</td>
<td>19</td>
<td>33.9</td>
</tr>
<tr>
<td>Good</td>
<td>37</td>
<td>66.1</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on the variable of practice in table 4 shows, 19 respondents (33.9%) have less practice and 37 respondents (66.1%) have good practice related to snack food of schoolchildren containing dangerous food additive.

Results of Bivariate Analysis

Table 5. Distribution of Respondents based on Knowledge Relations with Practice of Selection of Snack Food

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Practice</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less</td>
<td>Good</td>
<td>n %</td>
</tr>
<tr>
<td>Less</td>
<td>12</td>
<td>75</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>7</td>
<td>17.5</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>33.9</td>
<td>37</td>
</tr>
</tbody>
</table>

Based on table 5 above, shows there is a significant difference at the level of p = 0.000.

Based on the results of bivariate analysis in table 5 shows, there is a significant difference at the level of p = 0.000.
Based on the results of bivariate analysis in Table 5 shows that respondents with good knowledge category mostly have enough practice in choosing food snack as much as 33 respondents (82.5%), whereas respondents with good knowledge category that have less practice to the selection of food snack which contain harmful food additives by 7 respondents (17.5%). Respondents with less knowledge category mostly have less practice in the selection of food snack containing hazardous food additives by 12 respondents (75%). Knowledge is still low to be one of the food selection of snacks food.

Result of Chi-Square Test statistic test, the relation between knowledge to the practice of choosing food snack containing dangerous food additive in SDN 01 Poasia obtained p value = 0.000 with p value (α = 0.05).

Table 6. Distribution of Respondents by Relationship of Attitudes with Practice of Food Delivery Snack

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Practice</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>14</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Good</td>
<td>5</td>
<td>34</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>37</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>33.9</td>
<td>66.1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
</tr>
</tbody>
</table>

Based on table 6 above, Respondents with sufficient attitude category mostly have enough practice in choosing food snack as much as 34 respondents (87.2%), whereas respondents with less attitude category that have less practice to the choice of snack food as much as 14 respondent (12, 8%). Respondents with less attitude category mostly have less practice in the selection of food as many as 14 respondents (82.4%), while respondents with less attitude but will have enough practice in the selection of snack foods containing dangerous food additives of 3 respondents (17.6%).

The result of Chi-Square Test statistic test, the relation between attitude toward the practice of food snack selection containing dangerous food additive in SDN 01 Poasia obtained p value = 0,000 with p value (α = 0.05).

DISCUSSIONS

Teacher’s knowledge related to the selection of snack food of schoolchildren whose nutritional requirement and does not contain food additives is necessary for the students. With sufficient knowledge is expected to give a good influence on the practices and attitudes of elementary school teachers in choosing safe and healthy food.

The higher the level of a person’s health knowledge the higher his awareness to improve and maintain his health. Knowledge-based behavior will be more durable than behavior that is not based on knowledge, including the knowledge of nutrition, snack, and food snacks. Respondents with less knowledge category mostly had less practice in the selection of food containing 12 hazardous food additives (75%). Knowledge is still low to be one of the food selection of snacks food.

A good level of knowledge will be able to determine their attitude toward the food they will choose. If the attitude cannot be formed properly, then the knowledge possessed will stop at the cognitive stage only, so just know and no further practice.

Respondents with sufficient attitudes category mostly have enough practice in the selection of food snacks containing dangerous food additives as much as 34 respondents (87.2%). Respondents with less attitudes category mostly had less practice in the selection of food containing 14 additional food additives dangerous food as much as 14 respondents (82.4%), this is because the awareness is still lacking.

Attitude is an evaluative statement of an object or a person that reflects one’s feelings toward something. A person’s attitude will affect the knowledge he has. A person who has a good attitude is likely to have knowledge about food snacks compared to someone who has a lack of attitude. This is in accordance with the results of research which states knowledge of health the better will form a positive attitude.

Excessive feeding of food additives to foods is very harmful to health. For example, giving formalin
as a food preservative can lead to neuropathic pain.\textsuperscript{11,12} Therefore the use of food additives on food is strictly prohibited. The results of research in the city of Santos of Brazil pointed out that the existence of a health education through training is an effective tool to increase knowledge, in this case the training carried out on food. Food safety supervision should be conducted in an integrated manner, related to food additives used for snack food of schoolchildren and should require supervision from the school regarding the safety of snack food of schoolchildren. In this case, it is necessary for the attention of teachers who act as educators as well as acting as parents for their students in school, and is the best informant in conveying information related to snack foods containing food additives and hazardous chemicals to students in school\textsuperscript{13-15}.

**CONCLUSION**

There is a relationship between knowledge and attitude toward the practice of food snack selection containing dangerous food additive in SDN 01 Poasia Kendari.

**Conflict of Interest:** Authors declare that know any conflict of interest on this research and publication including from funding agency.

**Sources of Fundings:** Funding agency Collegeof Mandala Waluya Kendari Health Science, Kendari City, Southeast Sulawesi, Indonesian

**Ethical Clearance:** Obtained from College committee

**REFERENCES**


Hold Relax Technique and Oral Glucosamine are Effective on Decreasing Pain, Joint Stiffness, Functional Limitation and Serum Level of Comp in People with Osteoarthritis

Djohan Aras¹, Mochammad Hatta², Andi Asadul Islam³, Syafri Kamsul Arif⁴

¹Department of Physiotherapy, Faculty of Nursing, ²Department of Microbiology, Faculty of Medicine, ³Department of Neurology, Faculty of Medicine, ⁴Department of Anesthesiology, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia

ABSTRACT

Background (Introduction): This study aimed at investigating the effect of hold relax technique and oral glucosamine on physical symptoms of osteoarthritis such as pain, joint stiffness, and functional limitation, and the change of biomarker cartilage oligomeric matrix protein (COMP).

Material and method: The study was conducted at the Physio Sakti Clinic and Medisakti Clinic, involving 40 subjects who met the inclusion and exclusion criteria. Subjects were randomly assigned into two groups, intervention and control group. Intervention group was given hold relax technique and oral glucosamine, and control group was given standard physiotherapy treatment. Both group were treated three times a week for four weeks. Measurements were performed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) for pain, joint stiffness and functional limitation, and enzyme-linked immunosorbent assay (ELISA) methods was used for measuring serum level of COMP at baseline and week 4.

Results: The results showed that there were significant differences (p <0.05; CI = 95%) in terms of WOMAC score (pain, stiffness and functional limitation) and serum level of COMP between the intervention group and control group.

Conclusion: The combination of hold relax technique and glucosamine is more effective on improving osteoarthritis symptoms and biomarker COMP compared to standard physiotherapy.

Keywords: Osteoarthritis; WOMAC; COMP; hold relax technique; glucosamine.

INTRODUCTION

Osteoarthritis is the most common joint disease that affected elderly. Although the main issue in osteoarthritis is the degeneration of joint cartilage, it is actually a whole joint disease with the damage happened to all joint components including bone tissue, synovial tissue, cartilage, joint capsule, muscle and tendons around the joint¹. All joints in the human body can be affected by osteoarthritis, but the most frequent cause of complaints such as pain and stiffness is osteoarthritis of the knee joint. Osteoarthritis can be followed by biochemical change in the join such as the increase in serum levels of COMP as a biomarker of joint cartilage damage.

A population study in the United States report that severe radiological changes in joints affect 1% in people of the age 25-34 group. This figure increases to 50% in the age of over 74. According to Framingham study among the subjects over 45 years old, the prevalence of radiological knee osteoarthritis was about 19.2%, and in people aged 81 and over, the figure increased to 43.7%. In Dutch population, the prevalence of knee osteoarthritis in people over 54 years old is 30.5% in women and 15.6% in men. The prevalence of joint disease (including osteoarthritis) for the South Sulawesi, Indonesia, is approximately 26.7% higher than the national average, which is around 24.7%. The highest prevalence was found at age 65 and older, women more
than men\textsuperscript{4}. Based on data obtained at the Physio Sakti Clinic and Medisakti, people with knee osteoarthritis experienced a major complaint of pain and joint stiffness. This problem can lead to functional limitation in performing daily activities\textsuperscript{4}.

One of the common treatments to overcome the symptoms of osteoarthritis is pain medication and non-steroid anti-inflammatory drugs (NSAIDs) that aims to decrease pain and other symptoms in the affected joint. However, the effect of pain medication is not last for a long time and cannot solve the other physical symptoms such as the range of movement limitations, joint stiffness, and functional limitation that may not be pain related. In addition, pain medication may cause adverse side effects in the elderly patients if used for long periods\textsuperscript{6, 7}.

Hold relax is a special physiotherapy and exercise technique that consists of active and passive movement, isometric contraction, relaxed passive movement, traction and passive movement with additional force at the end of the movement to increase passive ROM. Another treatment of osteoarthritis is the administration of a drug containing glucosamine. Glucosamine aims to increase the production of joint fluid and serves as joint lubrication and nutrition in order to reducing the friction of collagen in joints. To our knowledge, studies on the combination of hold relax techniques and glucosamine on physical symptoms and biomarker of osteoarthritis has not been done. Therefore, the authors are interested to examine it.

**MATERIAL AND METHOD**

Pre and posttest with two groups design was used in this study. The study was conducted at the Physio Sakti Clinic and Medisakti from May to November 2017. Subjects were patients who came to the Physio Sakti Clinic and Medisakti Clinic with the chief complaint of knee pain and were diagnosed with osteoarthritis. A total of 40 patients were enrolled to participate in this study. Patients are eligible to participate if they were diagnosed with osteoarthritis according to clinical and radiological examination, experienced almost daily knee pain, and had no contraindication towards hold relax and glucosamine therapy. Patients were excluded from the study if they had a medical illness that impedes their participation in the study or were undergoing other treatments for their osteoarthritis. All patients signed an informed consent upon agreeing on participating in this study. Participants were then randomized into two groups, intervention and control, using sealed envelope methods.

The treatment group was given hold relax three times a week and glucosamine tablet once daily for four weeks and the control group was given standard exercises consist of sit to stand, standing on one foot, tandem standing, stretching and leg strengthening.

WOMAC score was used for measurement of pain, joint stiffness and functional limitation. Measurement of serum levels of COMP was using laboratory test by using ELISA method. Measurements were made twice; at baseline and week 4.

The statistical test used is paired t test or Wilcoxon for pre and post treatment comparison. The independent sample t-test or Mann-Whitney Test was used to compare the difference between the groups. The analysis of the difference is considered significant if p<0.005. Ethical approval for this study was obtained from The Ethics Committee for Biomedical Research on Human, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia.

**RESULTS**

On the general characteristics of the study subjects, it is presented in the Table 1,

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Control</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, Mean (range)</strong></td>
<td>60.25 (47-80)</td>
<td>59.80 (42-73)</td>
<td>ns</td>
</tr>
<tr>
<td><strong>Gender, female</strong></td>
<td>70%</td>
<td>75%</td>
<td>ns</td>
</tr>
<tr>
<td><strong>KL score</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree 3</td>
<td>85%</td>
<td>70%</td>
<td>ns</td>
</tr>
<tr>
<td>Degree 4</td>
<td>15%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td><strong>WOMAC Pain Baseline</strong></td>
<td>17.55 ± 0.80</td>
<td>17.20 ±1.67</td>
<td>ns</td>
</tr>
<tr>
<td><strong>WOMAC Stiffness Baseline</strong></td>
<td>7.15 ± 0.59</td>
<td>7.35 ± 0.59</td>
<td>ns</td>
</tr>
<tr>
<td><strong>WOMAC Function Baseline</strong></td>
<td>57.30 ± 2.85</td>
<td>55.65 ± 4.53</td>
<td>ns</td>
</tr>
<tr>
<td><strong>COMP Level Baseline</strong></td>
<td>833.45±231.25</td>
<td>782.20±270.75</td>
<td>ns</td>
</tr>
</tbody>
</table>
There was no significant difference between the intervention group and the control group, in terms of age, gender, degree of Kellgren-Lawrence (KL), WOMAC pain score baseline, WOMAC stiffness score baseline, WOMAC physical function score baseline and COMP baseline score.

Table 2. Effect of hold relax and glucosamine on the reduction of pain, joint stiffness, functional disorder and sCOMP

<table>
<thead>
<tr>
<th></th>
<th>Pretest (Mean±SD)</th>
<th>Post Test (Mean±SD)</th>
<th>ρ*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Pain</td>
<td>17.55±0.76</td>
<td>5.10±1.33</td>
<td>0.00*</td>
</tr>
<tr>
<td>2. Stiffness</td>
<td>7.15±0.59</td>
<td>2.60±0.68</td>
<td>0.00*</td>
</tr>
<tr>
<td>3. Function</td>
<td>57.30±2.85</td>
<td>11.80±3.66</td>
<td>0.00**</td>
</tr>
<tr>
<td>4. sCOMP</td>
<td>833.45±231.25</td>
<td>639.15±196.39</td>
<td>0.00**</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Pain</td>
<td>17.20±1.67</td>
<td>12.55±1.54</td>
<td>0.00*</td>
</tr>
<tr>
<td>2. Stiffness</td>
<td>7.35±0.59</td>
<td>5.50±0.69</td>
<td>0.00*</td>
</tr>
<tr>
<td>3. Function</td>
<td>55.65±4.53</td>
<td>41.10±4.66</td>
<td>0.00*</td>
</tr>
<tr>
<td>4. sCOMP</td>
<td>782.20±270.75</td>
<td>681.50±287.31</td>
<td>0.00*</td>
</tr>
</tbody>
</table>

* Wilcoxon test   ** t-test

Wilcoxon test and paired t-test (Table 2) showed that there are significant differences (p<0.05) between pretest and posttest on pain, joint stiffness, functional ability and sCOMP level in both groups.

Table 3. Differences in the effects of hold relax technique and oral glucosamine on the decline of pain, joint stiffness, functional limitation and sCOMP level between the groups

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Control</th>
<th>ρ*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>30.50</td>
<td>10.50</td>
<td>0.000*</td>
</tr>
<tr>
<td>Stiffness</td>
<td>30.50</td>
<td>10.50</td>
<td>0.000*</td>
</tr>
<tr>
<td>Physical Function</td>
<td>30.50</td>
<td>10.50</td>
<td>0.000*</td>
</tr>
<tr>
<td>sCOMP</td>
<td>24.85</td>
<td>16.15</td>
<td>0.019*</td>
</tr>
</tbody>
</table>

*Mann-Whitney test

The Mann-Whitney test (Table 3) showed that the changes of pain, stiffness, functional ability and COMP are significantly different (p<0.05) between the groups with intervention group perform better than the control group.

DISCUSSION

This study finding is in line with the Hindle et al. that found hold relax is effective on reducing pain, joint stiffness and functional limitation. This is based on the reciprocal inhibition and facilitation theory. When hold relax is applied sequentially, at the same time, inhibition of the sensory interneuron and alpha neuron occur causing the extensor muscle groups of the knee relax and contribute to the decrease of pain.

The application of reciprocal innervation theory through hold relax in knee joint osteoarthritis demonstrates that hold relax techniques can reduce pain and joint stiffness as well as overcoming the inflammatory reaction in the synovial by stretching the joint capsule. This leads to a decrease in functional limitation and the serum level of COMP. Glucosamine aims to increase synovial fluid as lubricants at both surface of joints as well as joint nutrition sources, thereby reducing friction in joint cartilage during daily activities.
The findings in this study are also consistent with studies by Mikolajec\textsuperscript{11} in runners who found improvement of muscle strength after exercise program and intervention of hold relax. Intervention of hold relax will increase the number of mitochondria in muscle, resulting in increased muscle size correlated with an increase in muscle strength according to filament sliding theory\textsuperscript{12}. Thus, there will be increased muscle strength in both flexor and extensor muscle groups and increase joint knee joint range of motion. The movements is known as reciprocal innervation, reciprocal facilitation and reciprocal inhibition\textsuperscript{13} which by Hindle et al.\textsuperscript{8} are known as cortical movements of optimal muscle contractions.

The results of this study are in line with studies by Kondratek et al\textsuperscript{14} that regular administration of hold relax can reduce stiffness in the thoracic region. This result was supported by Trent\textsuperscript{15} and Fasen et al\textsuperscript{16} who stated that giving proprioceptive neuromuscular facilitation (PNF) and hold relax techniques more frequently was more effective at reducing stiffness in the ankle joint.

There are two ways of reduction of joint stiffness in knee OA by hold relax techniques, 1) actively, where at the end of hold relax, the patient is asked to perform an active knee flexion, so the flexor muscle group is actively contracted and simultaneously the knee extensor muscle is relax through autonomic inhibition\textsuperscript{9, 10}, 2) passively, at the end of active movement, knee is flexed, then in the final position after hold relax, additional emphasis is given (extra passive forced), thereby joint stiffness will decrease\textsuperscript{17}. This is supported by Hindle et al\textsuperscript{8} who stated that the contraction and relaxation at the time of PNF hold relax techniques is especially passive movement at the end hold-relax will stretch the muscle fibers, the shortened muscle fibers will be elongated and reduce the knee joint stiffness in accordance with the flexibility and extensibility of muscles.

Anderson’s study and colleagues\textsuperscript{18} on patients with knee osteoarthritis found that after performing physical exercise there was an increase of sCOMP level on osteoarthritis patients compared to the control group. However, the increase return to lower than the initial level, half an hour after resting. One possible cause of this increase is the sCOMP changes caused by cartilage disorders and surrounding tissues such as synovitis, synovial contractures and swollen of the knee joints due to degradation of collagen, but are temporary in order to reduce joint stiffness, synovial contractile and joint capsule. When hold relax is performed, an inflammatory reaction occurs, characterized by the temporary increase of sCOMP as a sign of initiation of structural and joint functional improvement, especially if performed frequently sas in hold relax technique administration in this study\textsuperscript{17, 19}. Another possible explanation is the modification of cartilage degradation (extra cartilage turnover) in the sCOMP form where sCOMP is circulated to the lymphatic vessels and then to the circulatory system briefly during physical exercise for half an hour. Another research, by Neidhart and colleagues found that sCOMP increase in marathon athletes compared with the control group after marathon run, but the increase was back to previous level after 1-2 days of resting. This is one of the reasons underlying why hold relax is given daily intervals, i.e. three times a week for the intervention group.

Hold relax performed regularly to stretch out the synovial tissue results in less pain, and stretching the muscle tissue/tendon, and increases muscle strength, thus, increases joint space and reducing joint stiffness. This reduces friction between the ends of joint cartilage as it moves and decreases sCOMP\textsuperscript{17, 20}. It can be concluded that decreased knee joint stiffness in osteoarthritis patients will be followed by pain reduction, as decreased stiffness leads to reduced joints, tendons and muscle joint capsules, thus decreasing the irritation of the nociceptor and joint capsule during activities.

The research result indicates that hold relax technique and oral glucosamine were beneficial for reducing pain, decreasing joint stiffness and improving functional limitation. The intervention of oral glucosamine is intended to decrease the degradation of cartilage, as joint lubricants and nutrition, resulting in reduced cartilage friction of joints during activity. Therefore, it can be concluded that hold relax technique and oral glucosamine in osteoarthritis patients will improve the patient activity level that ultimately improve the quality of life.

**CONCLUSION**

Hold relax technique and oral glucosamine are effective on decreasing pain, joint stiffness, functional limitation and COMP level in osteoarthritis of the knee.

**Ethical Reserarch:** Obtained from university committee
Conflict of Interest: Authors of this article do not receive funding from any company or organization that would benefit from this article, and has disclosed no relevant affiliations beyond their academic appointment.

Source of Funding: This study was funded by the Research Grant of Faculty of Medicine, Hasanuddin University, Makassar, Indonesia.

REFERENCES
15. Trent V. An investigation into the effect of stretching frequency on range of motion at the ankle joint. Auckland University of Technology, 2002.
Analysis of 24-Hour Postpone Time of Newborn Umbilical Cord Clamp to Baby Weight Elevation Newborn in Kendari, Southeast Sulawesi, Indonesia

Rosmiati Pakkan¹, Sartini Risky¹, Adriyani¹

¹Epidemiology Study Program, Public Health Department, STIKES Mandala Waluya, Kendari, Southeast Sulawesi, Indonesia

ABSTRACT

Umbilical cord in baby, clamp between them. This is the labor procedure based on normal labor procedure applied recently. It risks the baby to be less zinc and weaker after laboring later tend to develop anemia and affect the baby weight. Newborn baby will be weighted in some minutes after laboring, then weighted in week one, two, three, body weight of the baby become the data to observe the body weight changing during newborn era. The aim of this study is to analyze the 24-hour pending time of umbilical cord clamp to the improvement of newborn baby’s weight in Kendari, Southeast Sulawesi. The study conducted in July – December 2017. It’s a quantitative research with experimental approach in post TS specification only control, statistic T independent group. Population in this study is each 25 newborns in 2 locations, they are Kandai Health Care (case) and Poasia Health Care (control). Samples were taken as accidental sampling which found when study conducted and meet the criteria : Satisfied APGAR score. We found an influence between 24-hour pending time of umbilical cord clamp and the body weight improvement in newborn in Kendari (p= 0.014). Conclusion, There is an influence between 24-hour pending time of umbilical cord clamp to the newborn baby weight’s elevation

Keywords: 24-hour-pending of umbilical cord clamp, newborn weight, Kendari, Southeast Sulawesi

INTRODUCTION

The First Week of the newborn baby is the most crucial phase because the baby will adapt to the new environment, blood circulation changing and functioned organs. When the baby was born, later the umbilical cord will directly be clamp to both part and cut, unfortunately based on WHO data, a number known as “2/3 phenomena is the first death day in neonatal (newborn baby aged 0-28 days) almost 99% of this occur in developing country. It is one of the health national degree’s indicators. High number of newborn death can be a sign of how dissatisfied of maternal and fetal care, however we need an effort to reduce the number of died newborns¹²

In Indonesia of all died newborns, as many as 57% passed away in the beginning phase of newborn (age less than 1 month) and each 6 minutes there is one newborn passed away. The causes are low body weight (29%), asphyxia (27%) etc (44%)

In Southeast Sulawesi, the number of maternal and fetal death is slightly high. In 2015, the number of maternal death reached 65 cases and the number of newborn death (0-28 days) reached 406 cases, if the means of this number calculated nationally, the case which occur in Southeast Sulawesi Province classified as high meanwhile in Kendari city, Southeast Sulawesi Province in 2015 the number of newborn death (0-28 days) reached 12 cases.

The negative effect of postponing the time of umbilical cord clamp is the occurrence of hypervolemia because the inability of the newborn to conduct extravasation plasma in sufficient number out of the blood circulation lead to the higher level of bilirubin than that in newborn with early clamp thus increase the eritrosite volume, in the pre-term newborn with postponing clamp, if hiperbilirubenimia occur can be solved using phototherapy but it will be more emphasize in the benefit of this method for aterm as well as premature baby³⁴.
Some experts, Dr Philippa Middleton from Adelaide University, have mentioned one of the positive effect is when clamp cutting is postponed, newborn has higher hemoglobin level for one or two day after labored. Newborn weight in which the umbilical cord cut is postponed is higher. In recent study, postponing the umbilical cord cut may increase initial hemoglobin concentration and zinc saving in the newborn.

The aim of this study is to understand the influence of 24-hour postponing time of umbilical cord to the newborn weight improvement in Kendari, Southeast Sulawesi.

**MATERIAL AND METHOD**

The study conducted quantitative method with true experimental approach in specification of Posttest Only Control Group Design, conducted in Kendari in 2 locations, they are treated group in Kandai Health Care meanwhile control group in Poasia Health Care in Kendari city in June 2017. Population is newborn located in Kendari city located in kandai Health Care (case) and Poasia Health Care (control). Sample taken as an accidental sampling. Samples were found during study which meet the requirements, as follows healthy newborn, born with normal labor, satisfied APGAR. Data collection conducting direct observation to the subject by writing objectively witness, observed and scored by the researcher during the study.

**RESULTS**

Based on the sex characteristic, reveal that of 25 case groups, female is 15 newborn (56%) and man is 11 newborn (44 cases) meanwhile in control group, 0f 25 newborn, female is 18 newborns (72%) and man is 7 newborn (28%)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dependent</th>
<th>Group</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>24-hour postponing of Umbilical cord clamp</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neonatus (case)</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Immediate cord clamp</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neonatus (control)</td>
<td>25173.64</td>
</tr>
</tbody>
</table>

Study results reveal that of 25 respondents the mean of body weight elevation ach week is 237.60 grams which conducted 24-hour postponed time of umbilical cord clamp and 25 immediately clamp after baby was born, the body weight elevation each week is 173.64 grams.

Based on the Independent T-test resulted T hit score(2.544) >T Table(2.062) or P value (0.014)<α(0.014). It means that there is significant difference in postponing 24-hour of umbilical cord clamp to the newborn body weight elevation.
Table 2. Respondent distribution based on 24-hour postponing time of umbilical cord to the newborn body weight elevation mention in the following table

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>t-count</th>
<th>t-table</th>
<th>p-value</th>
<th>( \alpha )</th>
<th>conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bodyweight elevation</td>
<td>2,544</td>
<td>2,062</td>
<td>0.014</td>
<td>0.05</td>
<td>Ho-denied</td>
</tr>
<tr>
<td>BadanNeneonatus</td>
<td>2,062</td>
<td>2,062</td>
<td>0.014</td>
<td>0.05</td>
<td>HaDiterima</td>
</tr>
</tbody>
</table>

Source: Primary data 2017

DISCUSSION

Body weight is one of the parameter to determine newborn health status, if the newborn body weight perform standard pattern it can be infer that the newborn is in the healthy condition and normal APGAR score then can be continued to conduct 24-hour postponing of umbilical cord after newborn was born. To strengthen the bond between the baby and the mother, it is necessary to put the baby the mother’s chest before the baby was cleaned up, because skin contact may present deep psychological effect between mother and newborn the first 1(one) hour after the baby was born, newborn insting brought them to search her/his mother nipple is an initial breastfeeding relation which continue between mother and the newborn.

Based on the univariate result reveal that 25 newborns, the mean number of body weight elevation is 237.60 grams which conducted 24-hour postpone time of umbilical cord clamp meanwhile 25 controls that is direct clamp, the mean number of body weight elevation of neonates is 173.64 grams. For the newborn baby which the umbilical cord clamp is postponed for 24-hour, the newborn is put on her/his mother under with the supervision of their families. If the newborn is separated with her/his mother then the stress hormone will increase 50% automatically and less to the decreasing of immunity and endurance of the newborn, but the researcher conducted procedure in the labor mother that is contacting between mother and newborn skin then the stress hormone will reduce and newborn become calm, distress and stable heartbeat, furthermore contact, strong sucking and licking of newborn to her/his mother during the early breastfeeding initiation will stimulate oxytocin which cause the uterus to contract and other hormones to release which makes the mother calm, relax and love newborn as well as stimulate the breast milk production from breast thus breast milk needs for newborn is enough for growing and increase the newborn body weight.

Newborn with direct umbilical cord clamp may prevent most of the number of zinc get into the newborn.\(^5\)

Similar to study by Endang Nurrochmi et all study concluded that hemoglobin level in the group of postponing time of umbilical cord has higher hemoglobin level than in the direct umbilical cord clamp. It allows newborn to experience suck reflection is less strong later stimulation nerve to anterior hipofise to release prolactin hormone is not optimal to stimulate breast milk production gradually, that is the 10-100 cc of breast milk because the breast milk production will not be optimal after 10-14 days because a healthy baby need 700-1000 cc of breast milk every day for optimal growth.

Mother, after laboring, use most of her time to sleep because of exhausting condition after labor then newborn who is not strong enough to stimulate her/his mother to suck her nipple when it comes to breast feeding time while the mother is limiting the breast feeding will reduce the nutrition that the newborn accept and reduce breast milk production.

Based on bivariate analysis, that is t-count (2,544)>t-table(2,062) or P value (0.014)<\( \alpha \) (0.05) stated that HO is denied and Ha is accepted, means that there is a significant influence between 24-hour postpone time of umbilical cord clamp and newborn body weight. It occurs because bonding attachment process is enough long time the newborn is under his/her mother’s supervision and affection cares of mother to her baby as well as skin contact may present deep psychological effect between the mother and the newborn thus early breast feeding initiation in the mother is longer, in the beginning of newborn when the baby suck nipple quite strong may produce 10-100 cc of breast milk. Breast milk production will be optimal after 10-14 days. Healthy newborn will consume 100 – 800 cc breast milk every day (around 600 – 1000 cc) for the development of the newborn.
Based on study that explain the factors which influence the newborn body weight they are maternal factor which include providing supplement of folic acid, calcium and zinc, meanwhile neonatal factor include 24-hour postpone time of umbilical cord clamp, breast feeding early initiation and Vit K consumption.

Breast feeding early initiation stimulates the nerve, nerve will lead brain to release two hormones they are prolactin and oxytocin then stimulates provided by the newborn on the nerve in the nipple can be delivered to the brain. Posterior lobe from Pituitary gland received the message and release oxytocin and cause contraction to the muscle cell around milk production cell thus prolactin stimulate alveoli to produce more breast milk, oxytocin cause the muscle cell around alveoli to contract, push the breast milk enter the saving tube and finally newborn can suck breast milk (let down reflex), thus the longer the baby suck, the more breast milk produce to fulfill the newborn needs. The 24 hour postpone time of umbilical cord in newborn that had been conducted by the researcher for a month, we did not find newborn with icterus, in contrast newborn reflects to suck increase result in the numerous breast milk production.

Postponing the umbilical cord clamp in the newborn can supply additional blood as many as 80-100 ml in the newborn and can contribute blood between placenta and newborn, provide placenta transfusion support for the newborn. Some expert stated that newborn with umbilical cord postpone can increase zinc level of newborn and influence the brain development, thus support the newborn to suck stronger and breast milk production is satisfying for the development of newborn.

CONCLUSION AND SUGGESTION

The study reveal that: there is a significant influence between 24-hour postpone of umbilical cord clamp and the newborn body weight elevation in Kendari.

Suggestion that can be recommended, hopefully the professional health provider can conduct 24-hours postpone time of umbilical cord clamp because it can supply additional blood as many as 80-100 ml to the newborn and distribute blood between placenta and newborn, thus newborn will be much healthier and effect to the optimum suck reflect to produce optimum breast milk for the development of newborn.

Conflict of Interest: The authors have no conflicts of interest associated with the material presented in this paper

Sourch Funding: This work supported by foundation of College of Mandala Waluya Kendari

Ethical Clearance: From University committee

REFERENCE

Risk Factor of Rheumatoid Arthritis among Elderly in UPT Panti Werdha Mojopahit Mojokerto District Indonesia

Abdul Muhith¹, M H Saputra², Arief Fardiansyah², Lady Andani²

¹Associate Professor in Nursing Department of STIKes Majapahit,
²Lecturer in Public Health Department of STIKes Majapahit

ABSTRACT

Elderly is an event that will surely be experienced by all people who are blessed with longevity. Along with increasing age, physical and mental abilities are slowly decreased will cause many consequences so susceptible to a disease due to a decrease in the system of the usual complaints of the elderly due to the pain that is felt very disturbing rheumatic diseases. The purpose of this study was to identify risk factor of rheumatoid arthritis. This research used case-control design. The population in this study were all elderly in Mojopahit nursing home care. Divided into two groups, 21 cases and 21 control cases. Data collected by questionnaire to measure risk factors and to determine rheumatoid arthritis disease with observation sheet, data analyzed by logistic regression. The results obtained in the questionnaire of genetic risk factors showed an OR = 50 with 95% CI (5,486-484,783), meaning that elderly people with a family history of rheumatoid arthritis risk 50 times to experience rheumatoid arthritis. Risk factors for obesity show an OR value of 1.403 with 95% CI (0.129-15.291) which means obesity is not a risk factor for rheumatoid arthritis. Smoking risk factor showed the value of OR 1.177 with 95% CI (0.149-9.289) which means smoking history does not include risk factor for rheumatoid arthritis. Risk factors that affect rheumatoid arthritis were hereditary risk factors. The results of this study are expected to provide input to the nursing home care management in its efforts for the prevention and treatment of the disease.

Keywords: Elderly, Nursing home care, rheumatoid arthritis, risk factor

PENDAHULUAN

Elderly is an event that will be experienced by everyone. Elderly are often considered powerless, sickly, unproductive so that its existence is often perceived negatively. They are often treated as a burden of responsibility by family, community, and country. Along with increasing age, the physical and mental abilities that have decreased will cause many consequences so susceptible to a disease due to a decrease in the system of the body that is usually complained of elderly due to the pain that is felt very disturbing is the rheumatic disease¹. Rheumatoid arthritis is a chronic joint inflammation caused by an autoimmune disorder. In rheumatoid arthritis autoimmune reactions mainly occur in synovial tissue. In synovial tissue, this will lead to an inflammatory process that causes damage to joints through the process of phagocytosis that can produce enzymes in the joints. These enzymes will break down collagen resulting in edema, synovial membrane proliferation, and eventually form a pannus. The pannus will destroy the cartilage and cause erosion of the bone, resulting in the disappearance of the joint surface which will interfere with joint motion. Muscles will be affected because muscle fibers will experience generative changes with the disappearance of muscle elasticity and muscle contraction strength¹. Several risk factors for rheumatoid arthritis include age, sex, level of knowledge, physical exercise, stress, environment, heredity or genetic factors, hormones, infections, obesity, salicylate and smoking exposure².

According to the World Health Organization, people with rheumatoid arthritis worldwide reach 355 million people, that means 1 in 6 people in the world have rheumatoid arthritis³. In Indonesia the prevalence of rheumatoid arthritis is 23.3% -31.6% of the total population of Indonesia and the prevalence of rheumatoid arthritis occurs at the age below 70 years, in
East Java is also quite high that is about 21.7% attack at the age of 49-60 years consists of 6, 2% of men and 15.5% of women. In 2012, the number of patients with rheumatoid arthritis reaches 2 million people, with the ratio of female patients three times more than men. It is estimated that this figure will continue to increase until 2025 with an indication that more than 25% will experience paralysis.

Risk factors for rheumatoid arthritis disease in Indonesia, for example, the highest prevalence is in mountainous communities, because cold air can cause rheumatoid arthritis. It also occurs due to the age factor, the more age the higher the risk for arthritis, the gender of rheumatic disease is likely to be suffered by women (three times more often than men) and can also occur in children this can be caused by stress, smoking, environmental factors, and can also occur in children due to hereditary or genetic factors. Foods containing high purine and fatty substances will result in rheumatism and excessive weight (obesity) will put a burden on the cartilage tissue in the knee joint and perform physical exercises such as rheumatic gymnastics as a therapy to relieve rheumatic symptoms in the form of stiffness and perceived pain by rheumatic sufferers.

In the elderly group, the symptoms of rheumatism can be reduced by doing regular exercise and in accordance with how to walk as often as possible to optimize the stability of daily activities, adjusting the diet that does not contain excessive fat in order to prevent obesity in the elderly, avoid risk factors due to smoking, avoid stress, because the sustained stress causes environmental factors to be uncomfortable.

### MATERIALS AND METHOD

Type of this research is observational analytic. Type of design used is Case-Control. This research was conducted at UPT Panti Werdha Majapahit Mojokerto and implemented on 11 and 12 April 2017.

The population of this study is the elderly present in the orphanage, where it is divided into a case population and control population with a total of 49 people. The number of samples was 21 people who had rheumatoid arthritis and 21 elderly people who did not have rheumatoid arthritis. In this study, questionnaires data collection instrument to measure risk factors for rheumatoid arthritis and data collection to determine the occurrence of rheumatoid arthritis disease in elderly with observation sheet from data obtained from medical record of health officer at UPT Panti Werdha Majapahit Mojokerto.

### RESULTS

While the second risk factor is obesity, the results showed that the p-value = 0.1904; OR = 0.416 with 95% CI: (0.1108 - 1.567) which means there is no relationship between obesity risk factors with the incidence of rheumatoid arthritis and obesity not including risk factors rheumatoid arthritis.

The third risk factor was smoking, the results showed that the value of value = 0.726 with the value OR = 0.781 with 95% CI (0.197-3106), which means there is no relationship between smoking risk factors with the incidence of rheumatoid arthritis and smoking is not included risk factors rheumatoid arthritis.

<table>
<thead>
<tr>
<th>Risk factors of rheumatoid arthritis</th>
<th>Elder</th>
<th></th>
<th></th>
<th>p-value</th>
<th>Odd Ratio (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td>Obese</td>
<td>5</td>
<td>9</td>
<td>0.1904;</td>
<td>0.416</td>
</tr>
<tr>
<td></td>
<td>Not Obese</td>
<td>16</td>
<td>12</td>
<td></td>
<td>CI 95% (0.1108 - 1.567)</td>
</tr>
<tr>
<td>Heredity</td>
<td>Positive</td>
<td>20</td>
<td>6</td>
<td>0.000</td>
<td>50.00</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>1</td>
<td>15</td>
<td></td>
<td>95% CI (5.429 - 460.519)</td>
</tr>
<tr>
<td>Smoking</td>
<td>Smoking</td>
<td>5</td>
<td>6</td>
<td>0.1904;</td>
<td>0.416</td>
</tr>
<tr>
<td></td>
<td>Not Smoking</td>
<td>16</td>
<td>15</td>
<td></td>
<td>CI 95% (0.1108 - 1.567)</td>
</tr>
</tbody>
</table>
DISCUSSION

a. Hereditary Risk Factors On Rheumatoid Arthritis Disease

The results showed that of 42 elderly, 20 elderly people suffering from rheumatoid arthritis had a family history of rheumatoid arthritis. The value of p-value = 0.000 with OR = 50 with 95% CI (5.429 - 460.519), which means there is a relationship between hereditary risk factors with the incidence of rheumatoid arthritis and the elderly who have rheumatoid arthritis offspring 50 times greater risk for experiencing rheumatoid than the elderly who do not has a history of hereditary rheumatoid arthritis..

Rheumatoid Arthritis is a chronic, destructive inflammatory disease, in which the immune system attacks the lining of joints and other parts of the body, including the tendons, ligaments, and bones. This disease tends to recur, usually for no apparent reason, and then heal itself occasionally for a month or even a year. Ailments exposed to rheumatoid arthritis can be damaged during each relapse, eventually leading to paralysis.

According to Karlson and Diane, one of the factors that can affect the disease of rheumatoid arthritis is a history of heredity. Some of the genes involved in the immune system are associated with an increased risk of developing rheumatoid arthritis conditions. If one of the identical twins is exposed to rheumatoid arthritis, the twin will be 20 times at risk for the disease compared to members of the general population. However, genes are not the cause of rheumatoid arthritis. Genes only provide a tendency for a person to develop the condition. Generally the incidence of disease caused by other external factors. In some people exposed to one of these other factors can trigger rheumatoid arthritis, wherein most people the effect is very slow until the individual has reached the threshold for developing rheumatoid arthritis.

Rheumatoid arthritis disease is caused by heredity which can develop continuously will result in the next generation also experience it. As we get older it will increase the risk of joint damage that is very influential in body function. Therefore one of the things that can handle it is by maintaining a healthy diet, maintaining a healthy body, regular exercise to prevent younger generation at the time of marriage in order not to have a history of rheumatoid arthritis.

b. Obesity Risk Factors On Rheumatoid Arthritis Disease

The second risk factor was obesity, the results showed that the value of value = 0.1904 with OR = 0.416 with 95% CI: (0.1108 - 1.567) which means there is no relationship between risk factors of obesity with the incidence of rheumatoid arthritis and obesity not including risk factors rheumatoid arthritis.

According to De Hair et al, more recent studies have consistently shown that obesity is not a predisposing factor of rheumatoid arthritis. In addition to the proportion of rheumatoid arthritis patients who tested negative for anti-PKC Antibodies. Although the reasons for these discrepancies are not usually discussed, it seems that strict methodological and standardization differences for the potential confounders of recent studies eliminate previous positive findings for obesity associations with the development of rheumatoid arthritis. A combination of an inactive lifestyle, this often leads to reduced muscle mass in the presence of increased accumulation of body fat and a stable or slightly increased body effect on weight gain glycolysis in the body will be broken down enzymatically if fatty changes become ketogenic bodies increases, it will cause ketosis the accumulation of ketones in the blood. Usually, this happens to people starving or hunger strike for too long. If the inclusion of acetyl Co-A into the Krebs cycle decreases as the decreased supply of glucose metabolism products or Co-A acetyl supply increases, acetyl Co-A accumulates to cause the ketone to increase in the liver, circulation, and then ketosis occurs. The three conditions that cause reduced intracellular glucose supply are fasting, diabetes, and a diet low in carbohydrates but high in fat. Glucose is called an antigenic factor because the administration of glucose inhibits the formation of ketones. In various tissues of acetyl Co-A changes to become acetoacetyl Co-A. In the liver for having the deacetylase enzyme, the acetoacetyl Co-A is converted to acetoacetate. The β-ketone acid is then converted to β-OH butyric acid and acetone, entering circulation because it is difficult to metabolize then excreted through urine and breathing.

In the orphanage, elderly behavior about irregular eating habits and lifestyle changes that alone cause the elderly uncontrolled health. Weight loss that causes the joints cannot support the activities of the elderly, walking
using aids and in front of the room and bathroom hand grip so as not to fall. How to handle maximum body condition that is balanced with regular exercise and good sleep patterns, this is proven because by exercising regularly it will improve the condition of strength and flexibility of the joints and minimize the risk of joint damage caused by arthritis. In UPT Panti Werdha Mojopahit Mojokerto only 6 elderly from 42 elderly has rheumatoid arthritis which has a body not included in obesity category because condition at orphanage does not keep the healthy diet and elderly often difficult to sleep at night because burden thinking about family.

c. Smoking Risk Factors On Rheumatoid Arthritis Disease

Based on the above table shows 42 elderly almost all 11 elderly (73.8%) are elderly who ever smoked at a young age especially in elderly men. Smoking risk factor shows the value of p-value = 0.726. Rheumatoid arthritis is not influenced by smoking risk factors based on the odds ratio of 0.781 with 95% CI (0.197-3.106) meaning that elderly who have the history of smoking does not include risk factor of rheumatoid arthritis.

According to the Journal of Vesperini reported that smoking status has no significant effect on rheumatoid arthritis, but reduces the progression of one-year radiographic disease in patients with early rheumatoid arthritis. In addition, the study suggests that the role of nicotine anti-inflammatory drugs may explain the lower systemic inflammation and structural disease progression in current smokers with patients with early rheumatoid arthritis. In a Swedish epidemiological study Reported that an increased risk of rheumatoid arthritis associated with smoking is quite possibly not due to nicotine, given the use of moist tobacco - smokeless tobacco containing nicotine is associated with a risk of ACPA-positive or ACPA-negative rheumatoid arthritis11-13.

Rheumatic patients who smoke is mostly in the elderly who never smoked, especially in the elderly men, this happens because the elderly who has a history of smoking at a young age. But now men rarely do not consume cigarettes in the orphanage because the provisions in the orphanage are not allowed to consume and finances are limited to buy. Basically, many students who practice in the orphanage provide counseling on the importance of maintaining health, especially in men about the dangers of smoking that can affect muscle strength of the joints so that paralysis due to unbalanced body balance. The way to handle it, though in youth is often consumed cigarettes are expected now not to consume as age gets older as age gets older the disease will be easy to come to the body. Research conducted at UPT Panti Werdha Mojopahit Mojokerto only 11 elderly from 42 elderly who smoke experienced rheumatoid arthritis of male gender. So there is a small sex male in the orphanage in the youth to consume cigarettes and most of the elderly female sex in the orphanage never consume cigarettes at a young age because that is in the orphanage mostly elderly women meaning that although most elderly men who have ever consumed cigarettes in youth will be outdone by the elderly gender who never smoked in youth14,15

CONCLUSIONS

Rheumatoid arthritis disease in elderly at UPT Panti Werdha Mojopahit Mojokerto showed from 42 respondents who had rheumatoid arthritis as many as 21 elderly and who did not experience rheumatoid arthritis as many as 21 elderly. There is an influence of hereditary risk factors on Rheumatoid Arthritis In Elderly, there is no influence of risk factors of obesity on Rheumatoid Arthritis disease in Elderly, and no influence of risk factor of smoking against Rheumatoid Arthritis disease In Elderly.

The results of this study are expected to add knowledge and knowledge about risk factors that affect the incidence of rheumatoid arthritis disease. For nursing staff, the results of this study are expected to provide inputs for nursing education institutions, especially in improving the learning process of gerontic nursing practice, especially information about the problem of rheumatoid arthritis disease, so as professional nurses can be better prepared for doing promotional and preventive actions about facing elderly in society with more good.

Conflict of Interest: Authors declare that no conflict of interest within this publication

Ethical Clearance: Ethical clearance from college committee

Source of Funding : Self funding
REFERENCES

Protease Potency Assay of Indigenous Proteolytic Bacteria in the Collagen Isolation Process from Snakehead Fish Scale (*Channa striata*)

Sugireng¹, Widodo², Suharjono²

¹Health Analyst Department, College of Mandala Waluya Health Science, Kendari Southeast Sulawesi, Indonesian, ²Biology Department, Mathematics and Natural Sciences Faculty Brawijaya University, Malang, East Java, Indonesian

ABSTRACT

The aim of this study was to find indigenous bacteria that have the potential to produce protease that can be applied in isolation of collagen from snakehead fish scale.

This study consists of isolation of proteolytic bacteria using skim milk agar (SMA) media, pathogenicity test using blood agar media, measurement of enzyme protease activity quantitatively, extracellular protease production based on the optimum production time and collagen isolation of fish scales using selected bacterial protease. Based on protease activity and pathogenicity test, 3 isolates that have the highest protease activity and non-pathogenic were found namely SB38 (658.3 U/mL), SB16 (618.3 U/mL) and SB23 (613.8 U/mL). Proteins produced by collagen isolation of snakehead fish scales using 3 isolates showed that the powder scales have shorter extraction time (12 hours) than the whole scales. The protein levels extracted from powder scales within 12 hours using isolate SB38, SB23 and SB16 obtained 14.89 µg/mL, 13.24 µg/mL and 12.41 µg/mL respectively. Extraction using isolate SB38 in whole scale and powder scales and extraction using isolate SB16 in powder scales show a clear pattern of protein bands and similar to band pattern of collagen which consists of coincident α-1 and α-2 (90-120 kDa) chains. Bacterial isolate SB16 and SB38 are isolates that produce potential protease in the process of collagen extraction of snakehead fish scales.

Keywords: proteolytic bacteria, protease, collagen, snakehead fish scale

INTRODUCTION

Collagen is a tissue-connecting protein and one of the most useful biomaterials because it has excellent biocompatibility and weak antigenicity¹. Based on these properties, collagen is widely used as an additive in the cosmetics, biomedical and pharmaceutical industries. Recently, the needs for more collagen are fulfilled from poultry and mammals such as cows and pigs. However, there are several obstacles for consumers to consume the products that contain collagen due to the many diseases found in poultry. One of the potential source of collagen is derived from fish scales².

Snakehead fish scale (*Channa striata*) has the potential as a source of collagen because the number of fish in public waters in 2010 was dominated by snakehead fish with production volume reached 34,017 tons (9.86%). In general, snakehead fish is widely used by crackers industry and other products such as the manufacture of vipalbumin. Processing fishery products will generate waste in the form of scales³. Fish scales contain many organic compounds including 40–90% protein in the form of collagen⁴. Fish scales are composed of collagen and have been identified as collagen type I ³

Manufacture of collagen from fish scales can be done through enzymatic extraction. In this enzymatic
extraction process, the enzyme used is a protease that can break the protein. Protease is an enzyme which is able to hydrolyze the peptide bond in a protein substrate (Pant et al., 2015). Protease produced by bacteria is preferred in the industrial sector because it has almost all the characteristics desired for biotechnology application. Most of commercial protease is produced from proteolytic bacteria, especially those that are neutral and alkaline. These bacteria generally are Bacillus genus including Bacillus macerans, Bacillus licheniformis, and Bacillus subtilis. Accordingly, in this study proteolytic bacteria isolated from fish processing waste are expected to be applied in the isolation of collagen from snakehead fish scales.

MATERIALS AND METHOD

Screening of Proteolytic Bacterial Isolates as Protease Producing

Isolate was selected based on pathogenicity test and enzyme activity assay quantitatively. Pathogenicity test was done to differentiate the bacteria that are pathogenic or non-pathogenic. Bacterial isolates were tested by streak method on blood agar media then incubated for 24 hours at 37°C. The isolates with gamma-hemolysis activity or no formation of a clear zone around the colonies indicated that these isolates are non-pathogenic. Non-pathogenic isolates were used for the enzyme activity assay. Protease enzyme activity was measured using 500 μL supernatant added to 500 μL substrate (2% casein in 0.05 M phosphate buffer pH 7). The suspension was incubated at 37°C for 10 minutes, then added 1 mL of 0.4 M trichloroacetic acid and incubated for 30 minutes at room temperature. The solution was centrifuged at 4000 rpm for 15 minutes at 4°C. Supernatant (crude enzyme) was taken 1 mL then put into a test tube and diluted with Tris HCl until the total volume of 2 ml. The absorbance of the solution was measured at 275 nm in wavelength. The value of protease activity was measured from tyrosine levels based on tyrosine standard curve with the concentration of 10-200 ppm.

Extracellular Protease Enzyme Production

Protease enzyme production was done based on the optimum incubation time of enzyme production that has been previously known. This process was done by making a starter. The selected isolates were grown in 50 mL of production medium, incubated for 24 hours at 37°C 180 rpm, taken as many as 10% (10^7 cells/mL) then inoculated into 500 mL of production medium which added 2% skim milk, then incubated based on optimum incubation time at 37°C 120 rpm. After incubation, the harvesting enzymes were done and then centrifuged at 10000 rpm for 10 minutes to obtain a crude protease extract in the form of supernatant. The supernatant will then be used for the isolation of collagen.

Enzyme Extraction of Collagen from Snakehead Fish Scales

Clean scales were kept in cold storage until the extraction. Samples of 10 g fish scales were then sterilized using UV. Sterilized scales were then added crude enzyme with a ratio of 1:10 and incubated for 12 and 24 hours. It was then centrifuged at 4500 rpm for 10 minutes. Furthermore, the supernatant obtained was precipitated using salting out method with absolute ethanol for 12 hours. Then, it was centrifuged at 4500 rpm for 30 minutes to precipitate the collagen fibers. The result of precipitation was then dialyzed using a cellophane membrane. Post-dialysis collagen was subsequently lyophilized for 12 hours in small containers.

Analysis of Collagen Protein Levels

Protein analysis is used to determine the concentration of collagen protein using the method of Bradford. A total of 0.1 mL of the sample was introduced into a test tube containing 2 mL Bradford reagent. Meanwhile, a blank was prepared by mixing 0.1 mL of distilled water and reacted with 2 mL of Bradford reagent. Incubation was performed for 10 minutes and the absorbance of each mixture was then measured at 595 nm in wavelength. Absorbance values obtained were substituted in the standard curve regression of BSA.

Analysis of Molecular Weight and Collagen Band Pattern

Samples of collagen and markers were added to buffer (0.6 ml of 1M tris-HCl pH 6.8, 5 ml of glycerol 50 %, 2 ml of SDS 10 %, 0.5 β-mercaptoethanol, 1 ml blue Bromophenol 1 % and 0.9 mL distilled water) with the ratio of 1:1, then incubated in boiling water of 100°C for 5 minutes and cooled. Then, 10 mL was infiltrated into the well of gel that composed of 10 % separating gel and 5 % stacking gel. Electrophoresis was carried out with the conditions of a constant current of 80 volts for 40-50 minutes until the tracking dye reach 0.5 cm
from the bottom of the gel. Once completed, the gel was taken for the detection of protein bands using Coomassie blue brilliant for 15 minutes. The staining was done for ± 30 minutes until the protein bands clearly visible.

**RESULTS AND DISCUSSION**

Screening Results of Bacteria as Protease Producing

Based on the results of the pathogenicity test of 11 proteolytic bacterial isolates, 5 isolates (SB12, SB16, SB23, SB34 and SB38) were found non-pathogenic. The five isolates did not show any clear zone around the colonies after 24 hours incubation. Bacteria that did not form clear zones on blood agar media are included in the type of hemolysis which is cannot hemolyze and react with red blood cells.

![Figure 1. Protease activity quantitatively of bacterial isolates.](image1)

Figure 1. Protease activity quantitatively of bacterial isolates.

Based on the results in Figure 1 found four proteolytic bacterial isolates that have protease activity which does not differ significantly (p> 0.05), namely isolate SB38 (658.3 U/mL), SB16 (618.3 U/mL), SB23 (613.8 U/mL), SB34 (595.5 U/mL) and isolate with the lowest activity namely isolate SB12 (425 U/mL). This shows that the five isolates are able to release tyrosine during the incubation period. Tyrosine is the result of the protease enzyme activity produced by bacteria in the decomposition of protein substrates contained in the growth medium.

Protease activity of isolate SB38, SB23, SB16 and SB34 are higher than isolate SB12. This is because each type of bacteria has different optimum conditions and also influenced by different environmental factors such as temperature, pH, concentration of enzyme and substrate. Each bacterium has an optimum temperature and pH on its growth. The effect of temperature, pH and aeration is an important parameter that affects the growth of bacteria and the production of protease enzymes.

Temperature and pH affect enzyme activity at a time of catalyzing a reaction. The increased temperature and pH that exceed its optimum condition weakens the bond in enzymes structurally. Based on research by Pant et al. Bacillus subtilis bacteria have the highest protease activity at pH 7.4 and a temperature of 40-50 °C (143.73 U/mL per min). Then, the research found temperature of 30 °C-37 °C is the optimum temperature of Bacillus sp. in producing the protease. It shows that every species of bacteria has different optimum conditions.

Protein Level from the Enzym Extraction from Snakehead Fish Scales

Extracellular protease production of selected bacterial isolates (SB16, SB23 and SB38) is applied in the process of extracting collagen of Snakehead fish scales. Protease enzyme in the process plays a role in breaking telopeptida. Telopeptida are proteins that form cross linking with the collagen.

![Figure 2. Protein levels from the extracting collagen of snakehead fish scales using protease of proteolytic bacterial isolates.](image2)

Figure 2. Protein levels from the extracting collagen of snakehead fish scales using protease of proteolytic bacterial isolates.

The results in Figure 2 show that the extraction using protease enzymes from isolate SB16, SB23 and SB38 both in whole scales or powder scales has been able to produce the protein collagen. It is also known that the extraction time needed is faster on powder scales than the whole scales. This is because the smaller the particle size, the more protein that can be extracted, small particle size has large contact area of volume unity so that the mass transfer between the solute from solid to solvent is larger. It can be seen in the extraction treatment using protease SB38 which is significant in powder scales, the time required to produce the protein level of 14.89 µg/mL is only 12 hours. Meanwhile, the whole scales take 24 hours to produce 14.01 µg/mL protein.
Characteristic of Collagen from the Extraction of Fish Scales

The band patterns and molecular weight of collagen from the extraction of snakehead fish scales using three proteolytic isolates shown in Figure 5. SDS-PAGE is done to determine the molecular weight of collagen from the extraction. SDS-PAGE (Sodium Dodecyl Sulfate-Polyacrylamide Gel Electrophoresis) is a protein separation technique based on molecular weight. In the SDS-PAGE analysis, all proteins are negatively charged. SDS causes denaturation of protein and binds to protein molecules to prevent the occurrence of protein interactions with proteins. During the process of electrophoresis, SDS-protein complexes will move towards the positive pole. Porous matrix in polyacrylamide gel then separates protein complexes based on their molecular weight.

Figure 3. SDS-PAGE of collagen type I from snakehead fish scales, M: Protein marker, 1: Extraction of whole scales using protease SB16 isolate, 2: Extraction of whole scales using protease SB23 isolate, 3. Extraction of whole scales using protease SB38 isolate, 4: Extraction of powder scales using protease SB16 isolate, 5: Extraction of powder scales using protease SB23 isolate, 6: Extraction of powder scales using protease SB38 isolate.

Based on the results in Figure 3, from six treatments of extraction using two types of scales (whole and powder) and three isolates (SB16, SB23 and SB38), there are only three treatments showed clear banding pattern, namely extraction treatment using protease isolate SB38 in whole scales and powder scales as well as the extraction treatment using protease isolate SB16 in powder scales. According to Muyonga et al.\textsuperscript{17} band patterns of collagen from fish are generally the same whether it comes from the skin, scales, tendons or bones. SDS-PAGE pattern in Figure 4 shows that collagen of snakehead fish scales has coincident between α-1 and α-2 (100-140 kDa) chains that can be observed clearly. This happens because the composition of the amino acid of α-1 and α-2 has the same molecular weight. Then, based on these results show that the collagen of Snakehead fish scales from the extraction of protease enzyme is a collagen type I because there are two chain structures of α (α-1 and α-2). Hema et al.\textsuperscript{18} stated that the collagen type I contains two identical α structures, ie α-1 and α-2. Both α structures in fish collagen can be separated by SDS-PAGE based on differences in affinity for the SDS, where α-2 has a higher affinity towards SDS compared with α-1. Based on the patterns found that the pattern and molecular weight are similar to some research results such as collagen type I from Labeo rohita and Catla catla fish scales with a molecular weight of 120-150 kDa in α chain\textsuperscript{19}.

Collagen is the major polypeptide consisting of three repetitive chains. The amino acid composition of collagen tends to be dominated by glycine, proline, hydroxyproline and alanine. There are about 27 types of collagen, in which each type can be classified into two, namely fibrils and non-fibrils\textsuperscript{20}.

CONCLUSION

Proteolytic bacterial isolates that have the highest protease activity and are non-pathogenic are SB38 (658.3 U/mL), SB16 (618.3 U/mL) and SB23 (613.8 U/mL). Bacterial isolate SB16 and SB38 are isolates that produce potential protease in the process of collagen extraction of snakehead fish scales based on the protein levels, band patterns and the molecular weight as well as visualization of collagen produced.

Conflicts of Interest: Authors declare that no any conflict of interest on this research and publication including on funding.

Ethical Clearance: Taken from University committee.

Source of Funding: The funding source in this research came from College of Health Sciences Mandala Waluya, Kendari.

REFERENCES

1. Lee, K., Park, H.Y., Kim, Y.K., Park, J.I. and Yoon, H.D., 2009, Biochemical Characterization of Collagen from the Starfish Asterias amurensis,


Related Factors Increased Obesity Prevalence in Adult Women in Denpasar City, Bali

Ni Komang Wiardani, I Putu Gede Adiatmika, Dyah Pradnya Paramita D, Ketut Tirtayasa

1Department of Nutrition, Polytechnic of Health Denpasar, Bali-Indonesia,
2Faculty of Medicine, Udayana University, Bali-Indonesia

ABSTRACT

Background: Obesity is a health problem whose prevalence increases every year. Obesity impacts on the incidence of dyslipidemia, hypertension and insulin resistance. Obesity is a multifactorial problem as a result of an interaction of biological factors, behavior, and environment.

Objective: The objective of the study was to investigate factors related to the increased prevalence of obesity in adult women in Denpasar city.

Materials and Method: This research is an observational research with a cross-sectional design. The study was conducted in Denpasar city with the subject is adult women. The samples were carried out by multistage random sampling, with a sample size was 274 people. The data collected included, obesity status, food intake, eating behavior and physical activities

Results: The results showed an average age of 39.3 years. 40.9% of samples were obese with BMI> 25 kg/m2. The sample proportion that consumed nutrient over the sufficiency of energy 52.9%, fat 51.5% and carbohydrate of 46.7%. 53.6% of samples have dinner habits> 19.00 pm, 50.2% consumed dense energy snack with frequent frequency and 79.9% stated access fast food easy to reach. A total 66.4% of samples have mild physical activity. Multivariate analysis showed that energy intake, dinner habits and physical activity were the major risk factors for increased prevalence of obesity (p <0.05).

Conclusion: energy intake, carbohydrates, dinner and physical activity is a major risk factor for obesity that occurs in adult women in the city of Denpasar.

Keywords: risk factors, obesity, prevalence, adult women.

INTRODUCTION

Obesity is a growing health problem prevalence in the world in various age groups including adulthood. The results of Flemming’s survey (2014) in a number of countries, the proportion of adults with a body mass index (BMI) of 25 or greater increased from 28.8% in 1980 to 36.9% in 2013 for men and from 29.8% to 38.0% for women. Overweight and obesity were estimated to cause 3.4 million deaths, 3.9% of years of life lost, and 3.8% of DALYs globally. The rise in obesity has led to widespread calls for regular monitoring of changes in overweight and obesity prevalence in all populations. Comparative, up-to-date information on levels and trends is essential both to quantify population health effects and to prompt decision-makers to prioritize action. Methods We systematically identified surveys, reports, and published studies (n = 1,769). WHO data (2015), showing about 39% of population >18 years are overweight and 13% are obese, the prevalence of obesity in the Asian region of 2013 is about 19.0% -48.6%6. Basic Health Research Data (2013), showing an increasing prevalence of obesity and adult obesity in Indonesia from 21.75% in 2010 to 26.3% in 2013. The prevalence of obesity in Bali is about 28.8% in 2013 and especially for Denpasar area the prevalence of obesity is around 30.1%.

Obesity can lead to increased dyslipidemia, hypertension, and hyperglycemia, a set of symptoms...
known as a metabolic syndrome as a major risk factor for noncommunicable diseases such as diabetes mellitus and cardiovascular disease.\(^8\) Obesity occurs due to energy imbalances as a result of interactions of biological factors, behaviors, and social environments characterized by lifestyles with an unhealthy diet and inadequate physical activity.\(^9\) 670 participants from the Whitehall II cohort study (73% male; mean age 56 years\(^10\)) Currently, the pattern of eating behavior has led to western patterns with high energy fat characteristics and poor micronutrients\(^11\) socio-demographic, lifestyle and anthropometric variables were collected. Dietary intake was assessed using a sixty-one-item FFQ. Dietary patterns were derived by factor analysis. The following two dietary patterns were identified: Western and traditional Lebanese. The Western pattern was characterised by high consumption of red meat, eggs and fast-food sandwiches. The traditional Lebanese pattern reflected high intakes of fruits and vegetables, legumes and fish. Female sex and a higher maternal education level were associated with a greater adherence to the traditional Lebanese pattern. As for the Western pattern, the scores were negatively associated with crowding index, physical activity and frequency of breakfast consumption. After adjustment, subjects belonging to the 3rd tertile of the Western pattern scores had significantly higher odds of overweight compared with those belonging to the 1st tertile (OR 2.3; 95\% CI 1.12, 4.73). The proliferation of fast food restaurants with interesting dishes but high energy density is very easily accessible to the community\(^12\-15\)

Progress in the field of information technology also spoils the community with various facilities so lazy to move. WHO data (2015) states 23\% of adult population is inactive.\(^16\) The prevalence of obesity was higher in people with low physical activity and increased the risk of obesity 3-4 times greater than in high activity.\(^17\) Sedentary activity causes less energy expenditure to be stored in the form of fat in adipose tissue.\(^18\) no physical activity Other factors that are also considered to play a role against obesity are sociocultural factors such as socio-economic, and knowledge \(^19\) In developing countries, economic progress increases the purchasing power and supply of foods that lead to excess intake and unhealthy eating behavior\(^20\) and outlines various justifications for government intervention in this area. The paper then focuses on the potential contribution of health economics in supporting resource allocation decision making for obesity prevention/treatment. Although economic evaluations of single interventions provide useful information, evaluations undertaken as part of a priority setting exercise provide the greatest scope for influencing decision making. A review of several priority setting examples in obesity prevention/treatment indicates that policy (as compared with program-based\(^21\))

**MATERIALS AND METHOD**

The study was an observational analytic study with the cross-sectional design was conducted in Denpasar for 5 months (April-July 2017). Subjects of the study were adult women with inclusion criteria aged 25-50 years, permanent residents in Denpasar city and willing as the sample by signing inform consent. The sample size of 274 people determined by Multi-Stage Random Sampling. Denpasar City consists of 4 districts and each district is taken one village randomly. The data collected include sample identity, food consumption and access to fast food, anthropometric data (weight, height and waist circumference), physical activity and other factors that support obesity. Identity data, food access and risk factor suspected to be associated with obesity were collected by interview, data of food intake was obtained by interview with recall method 1 x 24 hours, physical activity by interview using the International Physical Activities Questionaire (IPAQ).\(^22\) Data analysis included bivariate analysis using Q-square and multivariate analysis with multiple logistic regression (\(\alpha = 0.05\)).

**RESULTS**

**Obesity Prevalence**

According to on measurement of waist circumference sample with cut off> 80 cm for the woman and> 90 cm for man, obtained as many as 51.8\% samples have central obesity, as shown in the figure 1.

![Obesity Prevalence](image)

**Figure 1. Proportion of Obesity by BMI and Waist Circumference**

**Level of Nutrient Intake**

The result of the assessment of nutrient consumption
with recall 1 x 24 hours showed the average of nutrient intake of the sample that is energy 2060 Kcal (± 249,5 Kcal), fat 59,9 g (± 7.06 g) and carbohydrate 305,87 g (± 32.59 g), figure 2

Figure 2. Percentage of Sample by Level of Nutrient Intake Behavior and Eating Habits

Ease of access is not necessarily followed by frequency of visit, most of the sample states rarely visit fast food restaurant <1 times /week) as many as 65,7 % people, as seen in the figure 3.

Figure 3. Percentage of samples according Eating Behavior

Physical activity and physical exercise

Physical activity of the sample ranged from mild to moderate. Seen from exercise habits, exercise are often done samples are aerobic exercise and healthy walking. There were 63,9% samples stated rarely exercise frequency <1 times a week and 66,4% samples have light physical activity, as shown in the following figure 4.

Figure 4. Percentage of Samples by Level of physical activity and physical exercise

The Risk Factors Of Obesity.

To find out the correlation between various risk factors with obesity was used bivariate analysis with Q square. The result of the analysis showed that there were correlation between various risk factors such as age, education, nutrient intake, eating behavioral and physical activity with increasing obesity prevalence (p <0,05), as shown in table 2.

Table 2 . Bivariate analysis of risk factors with prevalence of obesity

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Obesity status according to BMI</th>
<th>Q square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Obes</td>
<td>Normal</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 30 years</td>
<td>20</td>
<td>7,3</td>
<td>6</td>
</tr>
<tr>
<td>30-40 years</td>
<td>79</td>
<td>28,8</td>
<td>46</td>
</tr>
<tr>
<td>&gt; 40 years</td>
<td>63</td>
<td>23,0</td>
<td>60</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Work/Housewife</td>
<td>25</td>
<td>9,1</td>
<td>28</td>
</tr>
<tr>
<td>Trader</td>
<td>14</td>
<td>5,1</td>
<td>14</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>43</td>
<td>15,7</td>
<td>27</td>
</tr>
<tr>
<td>Governement employees</td>
<td>32</td>
<td>11,7</td>
<td>17</td>
</tr>
<tr>
<td>Private employees</td>
<td>48</td>
<td>17,5</td>
<td>26</td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary scool</td>
<td>19</td>
<td>6,9</td>
<td>17</td>
</tr>
<tr>
<td>Junior high school</td>
<td>13</td>
<td>4,7</td>
<td>21</td>
</tr>
<tr>
<td>Senior High School</td>
<td>91</td>
<td>33,2</td>
<td>62</td>
</tr>
<tr>
<td>College</td>
<td>39</td>
<td>14,2</td>
<td>12</td>
</tr>
<tr>
<td>Energy Intake level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; recomended</td>
<td>82</td>
<td>29,9</td>
<td>63</td>
</tr>
</tbody>
</table>

Table 2 . Bivariate analysis of risk factors with prevalence of obesity
The Mayor Risk Factors of Obesity

The results of multiple logistic regression analysis showed that the factors of energy and carbohydrate consumption, dinner habit, and physical activity were the main risk factors for the occurrence of obesity in the sample (p< 0.05), table 3.

Table 3. The Mayor Risk Factors of Obesity

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>B</th>
<th>SE</th>
<th>Wald</th>
<th>Df</th>
<th>Sig</th>
<th>Exp (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.321</td>
<td>.238</td>
<td>1.814</td>
<td>1</td>
<td>.178</td>
<td>1.378</td>
</tr>
<tr>
<td>Education Level</td>
<td>-.291</td>
<td>.165</td>
<td>3.108</td>
<td>1</td>
<td>.078</td>
<td>.747</td>
</tr>
<tr>
<td>Energy Consumption Level</td>
<td>.798</td>
<td>.337</td>
<td>5.611</td>
<td>1</td>
<td>.018</td>
<td>2.222</td>
</tr>
<tr>
<td>Fat Consumption Level</td>
<td>.072</td>
<td>.383</td>
<td>.035</td>
<td>1</td>
<td>.851</td>
<td>1.075</td>
</tr>
<tr>
<td>Carbohydrate Consumption Level</td>
<td>.845</td>
<td>.380</td>
<td>4.957</td>
<td>1</td>
<td>.026</td>
<td>2.329</td>
</tr>
<tr>
<td>Snack food</td>
<td>.294</td>
<td>.308</td>
<td>.915</td>
<td>1</td>
<td>.339</td>
<td>1.342</td>
</tr>
<tr>
<td>Dinner habits</td>
<td>.665</td>
<td>.304</td>
<td>4.782</td>
<td>1</td>
<td>.029</td>
<td>1.945</td>
</tr>
<tr>
<td>Access fast food</td>
<td>.948</td>
<td>.389</td>
<td>5.943</td>
<td>1</td>
<td>.015</td>
<td>2.580</td>
</tr>
<tr>
<td>Physical exercise</td>
<td>-.457</td>
<td>.342</td>
<td>1.788</td>
<td>1</td>
<td>.181</td>
<td>.633</td>
</tr>
<tr>
<td>Physical activity</td>
<td>-.863</td>
<td>.343</td>
<td>6.335</td>
<td>1</td>
<td>.012</td>
<td>.422</td>
</tr>
</tbody>
</table>
DISCUSSION

The prevalence of obesity was 40.9% with BMI > 25 kg/m². The prevalence of obesity increased when compared to Basic Health Survey data in 2013 with a range of 28.8% for Bali and 30.1% for Denpasar. This figure is also higher than in some other studies such as Fleming’s research in some countries, showed the prevalence of obesity in women around 38.6% but lower than prevalence of obese women in the USA about 42.1% obesity prevalence doubled in adults aged 20 years or older and overweight prevalence tripled in children and adolescents aged 6 to 19 years. 3-5 This article provides the most recent prevalence estimates of overweight and obesity based on national measurements of weight and height in 2003-2004 and compares these estimates with estimates from 1999-2000 and 2001-2002 to determine if the trend is continuing. METHODS Prevalence estimates of overweight and obesity were calculated using data from the National Health and Nutrition Examination Survey (NHANES and in India about 41.4% .6

Obesity in women occurs from the age of 25 years to 55 years. Adult women who have entered the age of 40 years, decreased production of estrogen, progesterone, and growth hormone. Weight is easier to ride, although the portion of the meal remains. This condition will be exacerbated by decreased physical activity.6 While from the education level, the smallest proportion is experienced by the sample having higher education. In general, people with higher education are accompanied by sufficient knowledge about the function of food, will tend to be selective in eating food for themselves so avoid obesity. Increased prevalence of obesity caused by multifactorial risk factors. In addition to demographic factors, that are more dominant influence our lifestyle and environment with unhealthy dietary characteristics and sedentary physical activity.6,7 Several similar research results support these results like Cizza (2012) and Anderson (2014) research in the United States and Lamb (2014) in Australia shows that the frequency and consumption of fast food as a Western diet continually increases BMI and has a strong relationship with obesity. We hypothesized that food allergy patients are more often born in fall or winter. Objective Investigate whether season of birth is associated with food allergy. Methods We performed a multicenter chart review of all patients presenting to three Boston emergency departments (EDs) especially from fast-food restaurants, has increased in the United States since the 1970s. The main objective of this study was to examine the frequency and characteristics of fast-food consumption among adults in Michigan and obesity prevalence. METHODS We analyzed data from 12 questions about fast-food consumption that were included on the 2005 Michigan Behavioral Risk Factor Survey, a population-based telephone survey of Michigan adults, using univariate and bivariate analyses and multivariate logistic regression, and compared these data with data on Michigan obesity prevalence. RESULTS Approximately 80% of Michigan adults went to fast-food restaurants at least once per month and 28% went regularly (u22652 times/wk) Australia. Participants Sample of 882 women aged 18-201346 years at baseline (wave I: 2007/2008. The snacks food and fast food contain high energy and high fat, low in fiber and micronutrients that increase body fat deposits. Dinner> 19-20.00 pm, also causes all energy is stored as a reserve because there is no physical activity. Research in China also shows that western consumption patterns have the higher risk for obesity compared to traditional diet and Bowen (2015), showed that excessive energy intake positively associated with increased body fat where each addition of 100 calories increased energy intake 45 g of body fat. Energy intake and fat suggestion lead to a positive energy balance stored in adipose tissue that leads to obesity.

The demographic transition causes society including adult women to become less movement and communications tools to conduct their daily activities. Availability of various needs that the nature of delivery and online services also make people become lazier to move. If physical activity is very low, will be a positive energy balance. Participants from the Whitehall II cohort study (73% male; mean age 56 years Other studies have shown that there is an increase in BMI and
the prevalence of obesity in women who perform the mild activity. Physical activity has been identified as the fourth major risk factor for global mortality, which is about 3.2 million deaths worldwide.

Multivariate analysis showed that the level of energy intake, carbohydrate intake, dinner habits and physical activity were the major risk factors for obesity (p <0.05). Excessive energy consumption due to low physical activity will be buried in the body to form a positive energy balance, so that fat deposits more difficult to avoid that is reflected by obesity and obesity experienced by adult.

CONCLUSION

The prevalence of obesity in adult women in the city of Denpasar by BMI is 40.9% and on waist circumference is 51.8% Food intake is mostly above recommended of energy 52.9%, fat 51.5% and carbohydrates 46.7%, whereas most eating behaviors commonly consume energy-intensive desserts, regular dinners and very easy access to ready-to-eat foods. Energy intake, carbohydrates, dinner habits and physical activity are the main determinants of the increase of obesity adult women in the city of Denpasar.

Conflict of Interest: Authors declare that there is no conflict of interest within this research, publication paper and funding support

Ethical Clearance: Research has obtained approval from Udayana University Ethics Commission with Number.1558 / UN.14.2 / KEP / 2017.

Financial Source: This research and publication were supported by Health Polytechnic Ministry of Health, Denpasar Bali. Indonesia

REFERENCES

13. Cizza, G.; Rother K. Beyond fast food and slow


The Determinants of the Geographical Distribution and Transmission of 16S rRNA of *M. leprae* in Endemic Areas, Indonesia

Andi Rizki Amelia¹, Ridwan Amiruddin², Andi Arsunan Arsin², Burhanuddin Bahar², Mochammad Hatta³

¹Department of Public Health, Muslim Indonesia University, ²Department of Public Health, Hasanuddin University, ³Molucular Biology and Immunology Laboratory, Faculty of Medicine Faculty, Hasanuddin University

**ABSTRACT**

The prevalence of leprosy disease remains a worldwide public health problem including in Indonesia. There are five main countries as the foremost category of leprosy cases that include Brazil, India, Indonesia, Nigeria and the Democratic Republic of Congo. The research method used in this study was the observational study using a case-control research design. The total samples were 81 individuals that consisted of 27 leprosy patients (the case group) and 54 non-leprosy patients (the control group). Analysis of 16S rRNA gene expression was conducted using the PCR method to detect the risk of leprosy.

Distribution of leprosy disease at the endemic areas was caused by dwelling density and unhealthful environment, and moreover the distance among houses was only around 10 m as the causal factors of *M. leprae* transmission.

**Keywords**: leprosy patients, 16S rRNA gene, case-control.

**INTRODUCTION**

There are five countries in the foremost category of leprosy cases that include Brazil, India, Indonesia, Nigeria and the Democratic Republic of Congo. These countries have high endemic of leprosy disease. The estimated number of leprosy cases at the global level was 436,246 cases in the year 2008 cases in which (WHO, UNICEF, UNFPA, 2014). In 2008, leprosy cases were 436,246 worldwide, in which India was the first foremost category of leprosy with 83,041 cases, Brazil was the second foremost category of leprosy with 29,761 cases and Indonesia was in the third foremost category of leprosy with 19,785 cases respectively.(¹)

*M. leprae* identification is difficult due to the inability of the bacillus to grow in vitro, this leprosy diagnosis is based on microscopic detection of the bacilli combined with clinical assessment. DNA studies using polymerase chain reaction (PCR) have been used for the molecular diagnosis of *M. leprae*. (⁷)

Clinical manifestation of the disease varies widely among individuals. The transmission of *M. leprae* not only consider the cycle of transmission in the form of the source of leprosy disease, contact with the host, but also it is important to consider the source of infection,, bacterial virulence, frequency of contacts and the characteristics of the host, including his/her immunity, specific immunity, age, sex and nutritional status and other factors. (³)

16S rRNA gene is commonly found in species of mycobacterium and consequently 16S rRNA gene can be used to identify different species of mycobacterium. (⁵)

16S rRNA gene encodes a ribosomal RNA in a small sub-unit of the ribosome and it has a distinct nucleotide sequence in each bacterium. (⁵) In addition, 16S rRNA gene is more stable and it is suitable to be used as a specific molecular marker for the identification of 16S rRNA gene in bacteria (its existence is always retained in any conditions) and has identical characteristics in all

**Corresponding author:**
Andi Rizki Amelia
Email: kikiarizkiamelia@yahoo.co.id
organisms. Therefore, the use of 16S rRNA is suitable in identifying and analyzing a species at a molecular level.

Based on the background of problems, this study aims to assess the determinants of geographical distribution in epidemiology of leprosy disease in Indonesia.

**MATERIALS AND METHOD**

**Samples of the study**

The study was classified as population in this study as the observational study using a case-control research design. The population in this study consisted of both the case group and control group. The case group was leprosy patients (BTA+), whereas, the control group was non-leprosy patients in Makassar municipality. Statistical analysis for both the case group and the control group was done using the Lameshow formula.

This study was classified as the observational study in which the authors did not control the assignment of treatments by using a case-control research design where the exposures to risk factors for the case group were compared to exposures for the control group. Samples in this study were leprosy patients (BTA+) and non-leprosy patients (BTA-) in Makassar municipality. The total samples were 81 individuals that consisted of 27 leprosy patients as the case group and 54 non-leprosy patients as the control group.

The sources of data in this study were collected from primary data through direct observations that include the prevalence of leprosy cases and dwelling distance among leprosy and non-leprosy individuals.

The study instruments were observation sheets, Global Positioning System (GPS) and Corel Draw software X7. Observation sheets were used during direct observations or field surveys to date direct observations or field surveys were conducted at dwelling clusters and spatial distribution of leprosy disease. Global Positioning System (GIS) was used to digitization based on the coordinates of X and Y points of cluster and spatial distribution of leprosy disease. Global Information System (GIS) of individuals in the leprosy disease and risk factors of environment such as dust distribution by air. The study data were then analyzed and processed using the Corel Draw X7 software.

**Statement of Ethics**

All experimental procedures for the treatment of individuals as the samples in this study were reviewed and approved by the Research Ethics Committee of Medicine Faculty, Hasanuddin University, as stated in the Recommendation of Research Ethics issued in the registration no. 311/H4.8.4.5.31/PP36-Kometik/2017 with written permission from the respondents.

**RESULTS**

![Figure 1. Map of surveyed houses of leprosy cases in Makassar Municipality.](image)

The above map indicates dwelling density in the study area that leads to the transmission of *M. leprae*. Other factors that affect the distribution and transmission of *M. leprae* were poor conditions of dwelling. Most houses of leprosy individuals were semi-permanent and there were houses built on stilts, distances among houses were separated by wall or with house distance was ±10 m. Close interactions between leprosy individuals and non-leprosy individuals under the same dwelling as “the port of entry” of leprosy bacteria transmitted by air when leprosy individuals having coughing and sneezing that could release around 110,000 bacilli of *M. leprae*. Transmission through droplets increases the infection as well as skin contacts as the main route of transmission.

![Figure 2. The map of leprosy distribution in Makassar Municipality.](image)
Based on the map in Figure 2, the main clusters of distribution of leprosy cases in Makassar Municipality were found at Tamalate dan Biringkanaya subdistricts, as indicated in colored gradation.

**DISCUSSION**

In the geographic distribution analysis of PCR positivity among the cases with a positive bacilloscopy index in Fortaleza, individuals were found clustered in certain small areas. As expected, the areas surrounding those clusters were found clustered in certain small areas. These situations suggest that MB cases harbouring *M. leprae* in nasal cavities could be a major potential pathway for transmission of the bacillus within the population (16).

Based on direct observations at dwelling areas of respondents, there were 98.5% of respondents’ houses were in poor conditions to fulfill suitable healthy dwelling. Most houses of respondents have unsuitable physical components such as clay-floor and walls of their houses were permeable to water, poor ventilation and windows (floor area was <10%), poor ventilation for light rays that lead to high moisture. Such conditions cause adverse effects to dwellers and prompt to the growth of bacteria and other microorganisms as the source of transmission of leprosy (17). Kerr-Pontes (2006) (8) reported that water or ground were reservoirs for the growth of *M. leprae*. Other conditions that induced the risk of leprosy transmission at the endemic areas were the daily habits of the local people at the endemic areas did not use footwear that lead to the transmission of *M. leprae* through skin contact at wound area on the skin and ignore their wounded legs.

Local people at the endemic areas had close social interactions among their relatives and neighbors in daily activities. High intensity of touch between leprosy individuals and non-leprosy individuals could increase the transmission of leprosy disease. Poverty condition could intensify the transmission of *Mycobacterium leprae* bacilli which compels relatives and others to live together for long periods of time, especially young married couples and their children, typically under precarious sanitation conditions.

The average household density was higher in the residences with a leprosy case. Considering its total area, the main area of leprosy cases in Makassar Municipality has the highest household density in the residence with a leprosy case and poor sanitation due to a direct result of poverty. Such conditions facilitate the transmission of infectious disease. Social interactions among local families at the study area commonly occur at afternoon as the spare times as observed in their daily activities,

This study is in line with a study conducted in Bangladesh in which people with poor socioeconomic conditions susceptible to leprosy (1). Distance of road is insignificantly correlated with the transmission of leprosy in Bangladesh (1), whereas, distance of dike and dwelling is significantly correlated with leprosy case. A previous study reported that there was significant correlation between people who live around pond with the higher prevalence of leprosy cases (3). Another study showed that infected individuals generally have Multibasiller/MB who live under the same house with leprosy patients (9).

Global standardized guidelines for the diagnosis and treatment of leprosy with a goal of elimination have been available and in practice for more than 2 decades (9). Classical epidemiology and leprosy control program have frequently identified household contacts of patients as being at higher risk of infections than the general populations (10,11,4), explanation of tools are not routinely in place for tracing the origins and relationship of these and remaining new cases (12,13).

**CONCLUSION**

Based on results of the study, the determinants on the distribution and transmission of leprosy disease at the study areas were close density of dwelling, poor physical houses and semi-permanent houses which made of clay-floor and houses on stilts, close distance of houses separated by dividing wall with common distance of houses at the endemic areas was ±10 m. It is suggested to conduct strict control of the distribution of leprosy to target intervention more systematically to areas where the risk of leprosy is high, and there were two main clusters of leprosy in Makassar Municipality, i.e., Tamalate and Biringkanaya subdistricts,

**Source of Funding:** From Authors their selves

**Conflict of Interest** – Nill

**Ethical Clearance:** Obtained from the University committee
REFERENCES


2. BakkerMI, Scheelbeek PF, Van Beers SM. The use of GIS in leprosy control. Lepr Rev. 2009 Sep 1;80 (3):327-1


Behavioral Mercury Exposure of People in Artisanal and Small-Scale Gold Mining Site Area at Lebaksitu Village, 2017

Astri Getriana¹, Umar Fahmi Achmadi¹, Citra Hati Leometa²

¹Faculty of Public Health, Universitas Indonesia, ²Institute of Health Indonesia

ABSTRACT

Artisanal and Small-Scale Gold Mining (ASGM) is the second largest mercury contamination in the world after the burning of coal. ASGM uses gold and mercury amalgamation to extract gold from ores, then released into the environment to be waste during the process of purifying gold, so that it can affect the biota living in the environment. Lebaksitu Village is at an altitude of 690 meters above sea level, which geographically has a strategic potential for agricultural development. In addition, the area also produces some mining materials, such as limestone, aluminum, and gold. Mining and gold processing in Lebaksitu area has been around since 1994 until now, then the products are processed by the locals themselves. Agent disease with or without the ride of other environmental components enters the body through a process known as an “interactive relationship” process. The interactive relationship between the environmental component and the population along with its behavior can be measured in the concept called “behavioral exposure”.

This study aimed to analyze the behavioral mercury exposure of people in ASGM site area. The study used cross-sectional study design. The study was conducted on May 2017 with 68 respondents included in the research sample after determination of inclusion and exclusion criteria. Data were obtained from the laboratory test results of blood samples and interview results of respondents, then analyzed by using chi-square test. The results of study found no significant correlation between behavioral exposure and blood mercury level. As much as 77.9% of research subject had blood mercury levels above the threshold. There were 76.5% of people who behaved less well and the length of stay >10 years exceeding half of the total respondents interviewed (82.4%).

This study is expected to be useful in providing input to the Lebaksitu Village stakeholders as an effort to control the use of mercury to preserve the environment and improve the public health.

Keywords: behavioral exposure, mercury, ASGM

INTRODUCTION

Mercury is a toxic chemical element, which can mix with enzymes in the human body and cause the loss of enzyme’s ability to act as a catalyst for important body functions. Mercury can cause an acute and chronic toxicity in the body resulting in many dangerous diseases, such as disorders in central nervous system, heart, kidney, lung, autism and immune system of individuals of all ages¹.

Asian region is a region that has a major contribution to releasing mercury pollutants into the environment. The East and Southeast Asia contribute about 40% of the total mercury emissions to the environment, while the South Asia contributes about 8%². The high rate of mercury contamination in Asian region, especially in the developing countries, is due to the large number of traditional small-scale gold mining that are still operating. Gold mining and processing are a significant source of revenue for about 300,000 small-scale miners in Indonesia. As gold prices continued to rise, gold mining and processing have become more popular both among small and large-scale miners³.

Correspondence:
Astri Getriana
E-mail: astrigetriana@gmail.com
Small-scale gold miners are digging deep mine shafts in rural areas that are out of control. They dredge the river, destroy the forest, and pollute the environment. Although the practice of using mercury to extract gold is prohibited by the Indonesian Government in 2014, almost all small-scale miners use mercury to extract their gold. In the process, miners release hundreds of tons of mercury into water, soil, and air that ultimately contaminate food and wildlife.

Whatever the government ban on the use of mercury is the state’s efforts to protect its people to avoid dangerous diseases. If reviewing the side effects of mercury exposure in humans, the prohibition is in conformity with the Constitution of the Republic of Indonesia Article 28 H Paragraph (1) stating that everyone has the right to live a safe, healthy, and obtain health services.

One of the active artisanal and small-scale gold mining (ASGM) sites to date is located at Lebaksitu Village, Lebak District, Banten Province. Based on research conducted in this area, the mercury levels in water, soil, and fish taken from around ASGM site at Lebaksitu Village are 0.00392 ppm, 5.709 ppm, and 0.5175 ppm respectively. The results of these measurements indicate mercury levels exceeding the threshold, and that environmental pollution has occurred due to mercury.

Agents with or without other environmental components enters the body through a process known as an ‘interactive relationship’ process. The interactive relationship between the environmental component and the population along with its behavior can be measured in the concept called ‘behavioral exposure’. This concept was proposed by Umar Fahmi Achmadi. Behavioral exposure is the amount of contact between humans and environmental components that contain potential disease hazards. Person-to-person behavior is influenced by knowledge, education, gender, etc. The purpose of this study was to analyze the mercury exposure to the behavior of people in ASGM site area at Lebaksitu Village.

Behavioral exposure that leads to unhealthy living behavior becomes an agent of disease for himself. Behavioral exposure is not only the implication of a disease, but furthermore, unhealthy behavior (from behavioral exposure) is easily transformed into a habit of settling in the life of a community.

MATERIALS AND METHOD

The study was conducted in ASGM site area, Lebaksitu Village on May 2017. The research method was cross-sectional. Respondents in this study were people living around ASGM area at Lebaksitu Village with the total of 68 respondents after determined in accordance with inclusion and exclusion criteria. Respondents were selected with criteria including living more than 5 years around the ASGM site at Lebaksitu Village, at the age of more than 20 years old, not suffering from chronic illness, and not getting pregnant for women.

A blood mercury examination using the US EPA method analyzed using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) within 14 days. The variables examined consisted of behavior, fish consumption, smoking habit, length of stay, age, and mercury levels in the blood. All these variables used categorical data, so that the bivariate analysis used chi-square.

RESULTS

Blood mercury level was in average of 26.94 μg/L, then 77.9% of people had the blood mercury levels above the threshold. This indicates that the respondents have been exposed to mercury and may have an impact on their health. The result of behavioral variable measures showed that 52 (76.5%) people behaved less well. In the length of stay variable, the majority of study subjects were the people living >10 years (82.4%). Besides, the number of study subjects who often consumed fish was 61 people (89%). In the variable smoking habit, only 22.1% of the total study subject had a smoking habit.

The analysis found that behavioral exposure such as behavior, fish consumption, length of stay, and smoking habit did not correlate with blood mercury (Table 1).
Table 1: Correlation between Behavioral Exposure and Blood Mercury Level of Research Subjects in ASGM Site Area, Lebaksitu Village, 2017

<table>
<thead>
<tr>
<th>Variable</th>
<th>Blood Mercury Level</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abnormal</td>
<td>Normal</td>
</tr>
<tr>
<td>Behavior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less Well</td>
<td>39 (75.0)</td>
<td>13 (25.0)</td>
</tr>
<tr>
<td>Well</td>
<td>14 (87.5)</td>
<td>2 (12.5)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risky</td>
<td>24 (77.4)</td>
<td>7 (22.6)</td>
</tr>
<tr>
<td>Not at Risk</td>
<td>29 (78.4)</td>
<td>8 (21.6)</td>
</tr>
<tr>
<td>Length of Stay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>41 (73.2)</td>
<td>15 (26.8)</td>
</tr>
<tr>
<td>≤10 years</td>
<td>12 (100)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Fish Consumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequently</td>
<td>47 (77.0)</td>
<td>14 (23.0)</td>
</tr>
<tr>
<td>Infrequently</td>
<td>6 (85.7)</td>
<td>1 (14.3)</td>
</tr>
<tr>
<td>Smoking Habit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td>14 (93.3)</td>
<td>1 (6.7)</td>
</tr>
<tr>
<td>Not Smoking</td>
<td>39 (73.6)</td>
<td>14 (26.4)</td>
</tr>
</tbody>
</table>

Note: *Not Significant

**DISCUSSION**

Based on theory by Achmadi\(^6,7\) behavioral exposure is the amount of contact between humans and environmental components that contain the potential danger of disease. The size of behavioral exposure in this study is the amount of mercury in the blood of the people around ASGM site. The amount of mercury level in each study subject differs from one another as determined by their behavior. The following is the description of the statistical test results of behavioral exposure in this study:

**Behavior towards blood mercury level**

Behavior of subjects excavated in this study is about knowledge and attitude. The process is based on knowledge of positive awareness and attitude, then the behavior will be lasting. The behavioral variable of mercury in blood showed no significant relation (p value 0.492) with the proportion of the less well-behaved research subjects with an abnormal blood mercury level at 75%. While the proportion of less well-behaved research subjects with normal blood mercury level was greater at 25%.

**Age towards blood mercury level**

The results showed that there was no statistically significant relation between age and mercury in blood (p value = 1.000). The accumulation of mercury in human body tissues will correspond to the level of exposure as one gets older and the time of exposure. Increasing age leads to decreased organ function. The decrease in the function of these organs will lead to decreased work of the body’s metabolic system as well. Body defects due to mercury usually take about 5 to 10 years after exposure\(^9\).

**Length of stay towards blood mercury level**

Length of stay is defined as the time someone is at risk of exposure to hazardous chemicals, then the exposure can be through the respiratory system, digestion or skin absorption\(^10\). Statistically, the length of stay variable was not significantly correlated with blood mercury level (p value = 0.055). Based on the study results, there were no research subjects living ≤10 years with normal blood mercury levels. Then, subjects living >10 years at Lebaksitu had abnormal blood mercury levels at 73.2%. Length of stay also potentially supports the increase of Hg in urine, this is possible because the length of stay of respondents is more than five years\(^11\). Mercury has accumulative properties, so the length of stay can affect mercury levels in the body. Residents
living near the mine waste heaps significantly had elevating blood Hg levels, which indicates the impact of Hg mining and smelting activities. The longer a person lives in the polluted areas of mercury, the higher the mercury content in the body\textsuperscript{12}.

**Fish consumption towards blood mercury level**

People who like to consume fish had a higher mercury level than those who rarely consume fish. The long-term methylmercury exposure through food correlates linearly with the mercury levels in the blood. Methylmercury can be stored in fat tissue in fish up to 3,000 times in the water content, but it does not show mercury disruption or illness\textsuperscript{13}. Blood levels of mercury are 5-10 times lower than mercury levels in the brain\textsuperscript{14}. Based on the results of the analysis, there was no statistically significant relation between fish consumption and mercury in the blood with the proportion of research subjects who often consumed fish with abnormal blood mercury at 77%. Another study states that there is a relation between fish consumption and blood mercury levels\textsuperscript{15}. These results are differently assumed because based on interviews on research subjects, the research subjects consumed more salted fish bought in stalls. However, few research subjects consume fish from local ponds, the water used to irrigate the pond comes from a river that is used as a tailings disposal site in the gold mining process. Research by Inwiasri\textsuperscript{16} stated that humans can be exposed to mercury, one way that is through the consumption of foods such as fish. Most of the mercury in the fish body is methylated, this is because as a result of bioaccumulation and biomagnification of methylmercury in aquatic chain.

**Smoking habit towards blood mercury level**

Smoking is a major risk factor for the development and progression of cardiovascular disease, and cigarettes contain a slight amount of mercury. Mercury has been causally linked to cardiovascular diseases\textsuperscript{17}. The result of statistical test showed that there was no significant correlation between smoking habit and blood mercury (p value = 0.161) and there were 14 subjects who had smoking habit with abnormal blood mercury levels. However, there were more study subjects who did not smoke with abnormal blood mercury levels amounted to 39 subjects. Tobacco raises the large number of free radicals in the body. As free radicals increase, they are neutralized by the antioxidant enzyme super-oxide dismutase (SOD). By the age of 40 years, the amount of SOD in the body decreases causing free radicals to increase in the body, so that the capillary blood vessels narrow and cause oxygenation and nutrients to the liver organ is disturbed and hepatic cell injury\textsuperscript{18}

**CONCLUSION**

Based on the results and discussion, it can be concluded that:

77.9% of research subject have blood mercury levels above the threshold.

The behavioral exposure of Lebaksitu Village people is considered “risky” of the increasing mercury levels in blood because in the behavioral variable, there are 76.5% of less well-behaved people with the length of stay >10 years exceeding half of the total respondents interviewed (82.4%). However, statistically, there is no significant relation between behavioral exposure and mercury blood levels.

Behavioral exposure is evidently to be an agent of disease for Lebaksitu villagers, especially for the people who have settled more than 10 years. The behavior of such promotions has become an unhealthy pattern of life behavior and must be changed immediately, so that behavioral exposure will be no longer a disease agent for the local community and not passed on to the next generation.

The results of the analysis are expected to be useful to improve the healthy living behavior of the people around ASGM site and provide input to Lebaksitu stakeholders as an effort to control the use of mercury to improve the public health by considering behavior aspects that are closely related to the environmental health. The local government can also develop behavior change programs to address the behavioral exposure while considering age, socio-economic level, education, and cultural values.

Considering the behavioral exposure carried out by the people at Lebaksitu Village has become habitual and the behavior is done to sustain the economy of the people, then the challenge will be very big to make changes. Changes must be made gradually and in the long run. The government must also prepare the device and the way to substitute mercury use, so that residents are ready to leave the use of mercury. There are several methods to change the behavior of people, the first stage
is by providing educational information on the dangers of mercury exposure. However, information education alone will not work, so it needs to be accompanied by a long-term behavioral change program, with other methods such as classical conditioning, operant conditioning, or modeling for change in behavior settled on the people.

The first way that can be done in making a change program of behavioral exposure of mercury is to conduct an analysis of public understanding of the dangers of mercury and people's readiness in changing behavior, by using a trans-theoretical model of behavior change Taylor. The analysis results of the trans-theoretical model of behavior change can be used as a reference in making change programs of behavioral exposure in the people at Lebaksitu Village. The local government can also prepare a program of expenditure behavior change by using changing health behavior through social engineering program.

**Ethical Clearance** - Taken from University committee

**Source of Funding** - Self funding

**Conflict of Interest** – None

**REFERENCES**


Effectiveness of Household Insecticides to Reduce *Aedes Aegypti* Mosquitoes Infestation: A Community Survey in Yogyakarta, Indonesia

Dyah Widiastuti¹, Tri Isnani¹, Sunaryo¹, Siwi Pramatama Mars Wijayanti²

¹Health Research and Development Unit, Banjarnegara, Indonesia, ²Public Health Department, Faculty of Health Sciences University of Jenderal Soedirman

**ABSTRACT**

Dengue prevention and control efforts largely rely on insecticide application for vector control. Majority of people used household insecticide to reduce mosquito infestation. However, information about effectiveness of household insecticide to reduce mosquitoes infestation is still limited. Aims of this research is to analyse the effectiveness of household insecticide use to reduce the *Aedes sp* infestation in Yogyakarta, Indonesia. A questionnaire was administered to 900 respondents in three regencies in Yogyakarta (Sleman, Bantul and Gunung Kidul), and larvae collection was carried out in the house of respondents. The results showed that larvae indices in three regencies in Yogyakarta Province was >30%, indicating this area categorized in high mosquito populations. Majority of household insecticide in Sleman and Bantul was electric, 34.75 and 39.6% respectively, while mosquito coils was dominants in Gunung Kidul (51.6%). Based on chi-square test, the use of household insecticide had no significant effect on the infestations of *Aedes sp* mosquitoes. This facts should be a supported evidence that it is crucial to maintain the eradication of mosquito breeding site program in community, since the use of household insecticide is ineffective to reduce the mosquito infestations.

**Keywords:** dengue, virus, insecticide, *Aedes sp*, prevention, household

**INTRODUCTION**

Dengue is considered as major global public health challenge, particularly in the tropic and sub tropic area, affecting around 2.5 billion individuals in more than 100 countries¹. This disease caused by Dengue Virus (DENV), a member of the Flavivirus genus, which consisted of DENV-1, 2, 3, 4, 5 serotypes ²³. The spread of this disease is transmitted by *Aedes aegypti* as primary vector or *Aedes albopictus* as secondary vector⁴. Clinical manifestation of dengue could be asymptomatic (up to 75% of infections) or lead to more severe dengue such as lethal hemorrhagic (Dengue Haemorrhagic Fever/DHF) and capillary leak syndrome (Dengue Shock Syndrome/DSS)⁵. Transmission of DENV influenced by various factors such as human mobility, virus virulence, socio-economy, vector abundance, rainfall, temperature etc ⁶⁷.

Although a dengue vaccine (Dengvaxia) is available however its application is still limited⁶. Until recently, prevention of dengue is mainly rely on vector control such as community-based prevention to reduce mosquito breeding sites, and chemical control such as application of insecticides⁹¹⁰. Besides the insecticides which applied by the health authority to prevent and control mosquito borne diseases, people also use household insecticide as personal protection in their house. Household insecticide generally a ready to use product and can be easily applied by general public. Various type of household insecticide which applied indoor as day by day protection are mosquito coils, repellents, vaporizer mats, electric, and aerosol-releasing devices¹¹¹². Those products are available in shops, supermarkets and other outlets easily. Application of household insecticides was chosen because it is easy to use, easy to obtain and direct
result can be seen immediately. Four common classes of chemical insecticides have been used to control *A. aegypti* are organochlorines, organophosphates, carbamates and pyrethroids. Pyrethroids are seems to be the first choice of household insecticide than the organochlorine, organophosphate, and carbamate due to their favourable properties with regard to effectiveness and toxicity.

Besides its benefit, the use of household insecticides could affect several negative impacts on health. The active ingredients of the household insecticide usually only cover 5% of a pesticide product, while the remainder is inert ingredient, however it is still a toxic material. Several cases of household insecticide poisoning have been reported in East Jakarta and East Kalimantan. In addition, the occurrence of insecticide resistance in mosquito populations in some regions of Indonesia is also very possible influenced by the use of household insecticides. It is necessary to raise public awareness how to use household insecticides safely, by reading instructions and manufacturer’s recommendation. In addition, there is a concern that people no longer do mosquitoes breeding site eradication regularly because they rely more on household insecticide usage.

Several studies have proven the effectiveness of household insecticides in killing mosquitoes, however most of them is intervention studies. Information about how household insecticides could reduce mosquito infestation in long period is still limited. This study will explore how the use of household insecticide could reduce the mosquito infestation in the area of study by conducting larvae survey in the house of people in the area of study. Information of this study could be beneficial information about the use of household insecticides in community, and their effectiveness to reduce the mosquitoes.

**MATERIALS AND METHOD**

**Description of the study area**

The study site used in this study is in Yogyakarta Province, Central Java, Indonesia. Coordinates for this location as follow: 7°47′ South latitude 110°22′ East longitude. This area located near the southern coast of Java. The total area is 3,133.15 km², with 3,594,290 inhabitants. This province divided into four regencies, Sleman, Bantul, Kulon Progo and Gunung Kidul. We selected three regencies (Sleman, Bantul and Gunung Kidul) as study area. The average annual temperature in Yogyakarta is 26.4 °C, and precipitation averages is 2157 mm.

![Location of sample survey in Yogyakarta Province](image)

Figure 1. Location of study area in Yogyakarta Province. Star sign indicated the three regency which involved in this study.
Ethical Statement

Studies conducted here were carried out with ethical approval from National Institute of Health Research and Development-Indonesian Ministry of Health.

Data Collection

A questionnaire was administered to 900 household in 3 regency in Yogyakarta Province which were Sleman, Bantul and Gunung Kidul. 300 household of each regency were chosen with random sampling. Questionnaire consisted of questions about type of insecticide, frequency of use and time of use of household insecticide. This study was carried out on April-November 2015. Larvae collection was conducted in the house of respondents. We measured entomological parameters such as House Index (HI : percentage of houses infested with larva and/or pupae), Breteau Index (BI : number of positive containers per 100 house inspected), Container Index (CI : percentage of water-holding container infested with larvae or pupae), Pupae Index (PI : number of pupae per 100 house inspected).

The interpretation of transmission risk levels of each area was made based on the larvae index, as described in “A Review of entomological sampling methods and indicators for dengue vectors”. Larvae then reared in the laboratory until develop in to adults mosquitoes, then identified.

Statistical Analysis

Household insecticide use and time of use were calculated in percentage, chi square test for analysing household insecticide use and *Aedes* sp infestation using IBM SPSS Statistic 21.

RESULTS

1. Larvae Survey in the House of Respondents

Larval surveys were conducted at the house of respondents who were questioned about the use of household insecticides. Entomological indicators, namely House Index (HI), Container Index (CI) and Breteau Index (BI) at the survey location can be seen in Table 1.

Table 1. Entomology Indicator value in Bantul, Sleman and Gunung Kidul. HI (house index), CI (Container index) and BI (Breteau Index)

<table>
<thead>
<tr>
<th>Regency</th>
<th>Sub District</th>
<th>Village</th>
<th>HI (%)</th>
<th>CI (%)</th>
<th>BI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bantul</td>
<td>Bangun tapan</td>
<td>Banguntapan</td>
<td>37</td>
<td>33.1</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Sewon</td>
<td>Panggung harjo</td>
<td>42</td>
<td>30.9</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Kasihan</td>
<td>Taman Tirta</td>
<td>53</td>
<td>31</td>
<td>57</td>
</tr>
<tr>
<td>Gunung Kidul</td>
<td>Karang mojo</td>
<td>Beji Harjo</td>
<td>74</td>
<td>36.6</td>
<td>142</td>
</tr>
<tr>
<td></td>
<td>Wonosari</td>
<td>Kepek</td>
<td>56</td>
<td>41.9</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Wonosari</td>
<td>Siraman</td>
<td>58</td>
<td>36.2</td>
<td>76</td>
</tr>
<tr>
<td>Sleman</td>
<td>Ngaglik</td>
<td>Sardonoharjo</td>
<td>63</td>
<td>47.3</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Depok</td>
<td>Catur tunggal</td>
<td>50</td>
<td>33.1</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Godean</td>
<td>Sido Agung</td>
<td>36</td>
<td>20.1</td>
<td>42</td>
</tr>
</tbody>
</table>

Based on Table 1, all the sub district categorized as high mosquito population based on WHO density figure (ref).

The location of the breeding place of the mosquito larvae was also identified during the study, with results seen at Figure 1.
Based on the result, all of three regencies showed that more breeding place outdoor than which located indoor.

2. The Use of Household Insecticides

From 900 respondents in three regencies, 102 respondents (34%) in Sleman stated they used household insecticide, while in Bantul and Gunung kidul were 142 (47.3%) and 127 (42.3%), respectively. We also record the type of household insecticide which used by the respondents (Table 2).

<table>
<thead>
<tr>
<th>Type of formulation</th>
<th>Sleman (%)</th>
<th>Bantul (%)</th>
<th>Gunung Kidul (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosol</td>
<td>34</td>
<td>31,3</td>
<td>10,9</td>
</tr>
<tr>
<td>Mosquito coils</td>
<td>31,3</td>
<td>29,4</td>
<td>51,6</td>
</tr>
<tr>
<td>Electric</td>
<td>34,7</td>
<td>39,6</td>
<td>37,5</td>
</tr>
</tbody>
</table>

Based on the type of insecticide formulation used by the community in the three regencies, people in Sleman in Bantul more likely use aerosol and electric, while people in Gunung Kidul more likely use mosquito coils.

Table 3. Percentage of household insecticide usage time in Sleman, Bantul and Gunung Kidul regencies

<table>
<thead>
<tr>
<th>Regencies</th>
<th>Morning-Evening (%)</th>
<th>Night time (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleman</td>
<td>8,2</td>
<td>91,8</td>
</tr>
<tr>
<td>Bantul</td>
<td>18,6</td>
<td>81,4</td>
</tr>
<tr>
<td>Gunung Kidul</td>
<td>8</td>
<td>92</td>
</tr>
</tbody>
</table>

In three regencies, most of respondents used insecticides at night, compared to morning and evening.

Based on the results, there was no relationship between the use of household insecticide with the presence of larvae *Ae. aegypti* in the home environment in each regency.
DISCUSSION

Community survey which conducted on 900 respondents in three regencies revealed the high density of mosquito density in the study area. Based on house index, all the villages showed HI more than 10% indicates that the area is at high risk for contracting dengue virus in community. All the villages in this study were not met the minimum standards of mosquito population, since the minimum standard of HI is below 5% and Free Larvae Index (FLI) above 95%. Based on larvae survey, mosquito larvae were found in outdoor higher than indoor (Figure 1). This results in accordance with several previous studies. The type of insecticide formulation most widely used by communities were diverse in the three regencies. 34.7% respondents in Sleman and 39.6% in Bantul more likely use electric formulation. While community in Gunung Kidul, 51.6% more likely use mosquito coils. Many people used mosquito coils because its economical reason and practical use because it does not have to use electric power. The material of mosquito coils contains compounds which capable of burning and release insecticide gradually. Unfortunately, the mosquito coil smoke could affect acute respiratory infections (ARI) and other illnesses.

In this study, we proved that there was no relationship between the use of household insecticide with the presence of larvae *Ae. aegypti* in the home environment in each regency. The use of household insecticide has no significant relationship with the reduce of *Aedes* sp population in community. This suggests that community efforts to reduce mosquitoes by using household insecticide are ineffective, since the mosquito density in study area were still high. This might because they use insecticide at night, while the *aedes* sp is active during the day. Time usage error which happened might due to lack of public knowledge about bionomic mosquitoes *Aedes* sp. In this study, respondents in all three regencies used the household insecticides during the night (Table 4), while the peak of *Aedes* sp activity occurs in the morning and evening. In addition, there is a possibility that the community assumes that the use of insecticides is sufficient to prevent disease, thus ignoring other such preventive measures such as routine eradication of mosquito breeding site. It is important to educate people that household insecticide is only one of several attempts to reduce mosquito infestations, therefore practice of mosquito breeding site eradications is more important. Routine practice to reduce mosquito population by cover the lid of water container, drain the water container regularly and discard unused thing which potentially to be breeding site of mosquitoes are essential as dengue prevention in community.

The results of this study indicated the need of more information about how to use insecticides wisely in community. The lack of knowledge leads to misuse of household insecticide. Long-term use of insecticide use may cause insecticide resistance and may also pose a health hazard such as respiratory, neurologic, dermal, cardiovascular dysfunction. High density of mosquito population in study area indicated that it is still important to use insecticide properly. However, routine eradication of mosquito breeding site must still be implemented.

CONCLUSION

Mosquito infestation in all study area were high based on their entomology index, which represented that the area of study categorized as high risk for dengue transmission. Community in Sleman and Bantul tend to use aerosol and electric insecticides, while in Gunung kidul prefer to use mosquito coils. The high density of mosquito in the area of study could be because most of people applied insecticide at night, while *Aedes* sp active at daytime. Based on statistic analysis, there was no significant correlation between household insecticide use and mosquito infestation in the area of study. This result showed that the use of household insecticide in Yogakarata Province ineffective to reduce the density of *Aedes aegypti*.

Conflict of Interest: None

Funding Source: National Institute of Health Research and Development-Indonesian Ministry of Health

Ethical research: National Institute of Health Research and Development-Indonesian Ministry of Health.

REFERENCES

2. Mustafa MS, Rasotgi V, Jain S, Gupta V. Discovery of fifth serotype of dengue virus (DENV-5): A new


22. Hogarth JN, Antwi-Agyei P, Obiri-Danso K.


The Threat of Lymphatic filariasis Elimination Failure in Pasaman Barat District, West Sumatra Province

Bina Ikawati¹, Tri Wijayanti¹, Jastal¹

¹Banjarnegara Health Research and Development Unit Class 1, Banjarnegara, Indonesia

ABSTRACT

Introduction: Mass Drug Administration (MDA) of Lymphatic filariasis in Pasaman Barat District started in 2007. Result of Lymphatic Filariasis (LF) pre Transmission Assessment Survey (pre-TAS) in 2012 not pass, therefore MDA continued as long two years in 2014 and 2015. Coverage MDA in 2015 as much 78.69% from 319,567 residence. Result of pre-TAS and TAS 1 after round 2 of MDA in Pasaman Barat pass the evaluation.

Method: The data used in this analysis obtained from Elimination of Lymphatic filariasis Evaluation Study in Indonesia at 2017, one of which is located in Pasaman Barat. Research conducted on February-November 2017 in Katiagan Village as sentinel area and Ujunggading Village as location that found positive TAS 1 at school children. Blood smearss for filariasis examination collected from 631 resident, vector and reservoir survey done at that location for microfilaria examination. Qualitative analysis was conducted to combine information about the threat of Lymphatic filariasis failure in Pasaman Barat. Content analysis of indepth interview results is primarily about opportunities to prevent the possibility of elimination failure.

Results: Survey in Pasaman Barat showed Mf rate in Pasaman Barat District 0.95% and Katiagan Village 1.6%. Brugiamalayi detected on vectors and reservoirs specially in Katiagan Village, this supported for Lymphatic filariasis transmission. Head of government at all level of government, health staff, costumary institutions, customary activity like wedding ceremony can be the entrance to the socialization activities of LF prevenyion and elimination.

Conclusions: In general, MDA filariasis in Pasaman Barat has succeeded in reducing filariasis rate, but in Katiagan still endemic.

Keywords: Lymphatic filariasis, elimination, failure, Pasaman Barat, MDA

INTRODUCTION

There are 236 districts/cities endemic Lymphatic Filariasis (LF) until the end of 2016 in Indonesia. Lymphatic filariasis Mass Drug Administration (MDA) for 5 consecutive years has been completed in 55 of 236LF endemic districts/cities. In the third year of MDA implementation, a pre-survey was conducted by finger blood survey to determine whether or not there was microfilaria in the blood. Subsequent evaluation of a TAS-1 transmission assessment using Rapid Diagnostic Test (RDT) was performed after 5 years of MDA completion.¹ Lymphatic Filariasis MDA particularly where incorporated into sanitation and education programmes has already made significant improvements to global health and productivity and has the potential for further successes.² However logistical, financial and biological challenges remain. The area with Brugiamalayi and/or Brugiatimori RDT parasites used was brugia rapid testTM. with the working principle of diagnosing the presence or absence of antibody B. malayi/B. timori. The area with Wuchereriabancrofti parasite is used Immunochromatographic Test (ICT) with the working principle of diagnosing the presence or absence of antigen W. bancrofti.³,⁴,⁵ The condition of district/city endemicity that has been completed by MDA can be known from TAS-1 results. The area where the score is
below the cut-off value then the district/city is declared
to pass, and above the cut-off value is MDA reset for 2
rounds (2 years). The area that passed TAS 1 for 2 years
carried out LF surveillance after it was evaluated (TAS-2).
The same cycle was carried out from the evaluation of
TAS 2. The districts / cities that passed TAS-2 two years
later performed the evaluation (TAS-3). Districts / cities
receiving eliminated LF certificates within 2 periods of
surveillance can be passed by TAS graduation status.
In 2015 there are 29 districts / cities that have passed the
Transmission Assessment Survey (TAS) and 22 districts /
cities received LF certificates within 2 periods of
surveillance can be passed by TAS graduation status.

The result of pre-TAS (Transmission Assessment Survey) in 2012 result that the district did not pass, so that mass treatment was continued second round in 2014 and 2015. POPM coverage in 2015 was 78, 69%. Evaluation of Transmission Survey 1 (TAS 1) in 2016 in Pasaman Barat passed. In 2017, multicenter studies of LF Elimination Evaluation Study in Indonesia are located in failed districts and pass pre-TAS and TAS in Pidie, Aceh Jaya, Nias, LabuhanBatu, Pasaman Barat, Pesisir Selatan, Agam, LimapuluhKota, Bangka Barat, Belitung, KuantanSenggigi, Pelalawan, Tangerang, Subang, West Kotawaringin, Hulu Sungai Utara, Enrekang, Donggala, Bombana, North Kolaka, Buton, Tidore Islands, Merauke and Boven Digul. Selection of sample locations based on pre-TAS and TAS results conducted by Sub directorate LF disease control in 2016. The research sites are areas with varied parasites, there are endemic areas of B. malayi zoonotic and non-zoonotic, and W. bancrofti. Lymphatic Filariasis in Pasaman Barat district is attractive to do a more in-depth analysis because in this study showed that one of the LF finger blood survey sites in Katiagan Village Kinali Sub district showed Mf rate above 1%. Although at the District rate from the survey in two locations (Katiagan Village, Kinali Sub district and Ujunggading Village Lembah Melintang Sub district) the Mf rate is below 1%. The analysis aims to describe the risks and predictions that can occur related to the results of research with the discovery of patients who are LF positive, environmental conditions and factor analysis that has the potential to participate in the eliminate of LF.

MATERIALS AND METHOD

This paper uses part of research data of LF Elimination Evaluation Study in Pasaman Barat. Research conducted on February-November 2017 in Katiagan Village as sentinel area and Ujunggading Village as location that found positive TAS 1 at school children. Blood smears for microfilaria examination collected from 631 resident. Vector and reservoir survey done at that location for microfilaria examination by Polymerase Chain Reaction. Qualitative analysis was conducted to combine information about the threat of LF failure in Pasaman Barat. Content analysis of indepth interview results is primarily about opportunities to prevent the possibility of elimination failure.

RESULTS

Pasaman Barat has an area of 3.887.77 km², with wide of ocean region of 800.47 km² and coastline as long as 152 km. Pasaman Barat District is located between 0 - 2,912 meters above sea level. Astronomically, Pasaman Barat District is located between 003° - 0011°South Latitude and between 99°10' -100°04'East Longitude and crossed by equator line. North of Pasaman Barat bounds with Mandailing Natal District, in East bounds with Pasaman District, in South bounds with Agam and Pasaman District and in West bounds with Indonesian Ocean. Katiagan area is a residential area surrounded by swamps, oceans and sawit plantation. While Ujunggading Area is a residential area that there are many fields and oil palm plantations. Map of Pasaman Barat from googleearth showed in picture 1.

![Picture 1 Location of Pasaman Barat District](image)
Table 1. Finger blood survey results in 2017

<table>
<thead>
<tr>
<th>Location</th>
<th>Amount of blood smears</th>
<th>Blood smears positive Mf</th>
<th>Mf rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katiagan Village, Kinali Sub district</td>
<td>314</td>
<td>5</td>
<td>1.59%</td>
</tr>
<tr>
<td>Ujunggading Village, Lembah Melintang Sub district</td>
<td>317</td>
<td>1</td>
<td>0.32%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>631</strong></td>
<td><strong>6</strong></td>
<td><strong>0.95%</strong></td>
</tr>
</tbody>
</table>

Table 1 shows that in Katiagan Village, Kinali District Mf rate 1.59%. The value of Mf rate of Pasaman Barat District shows 0.95%.

Survey of mosquitoes shows that *Mansonia dives, Culex Vishnui, Aedes canricomes* and *Aedes aegypti* found positive microfilaria by Polymerase Chain Reaction (PCR) test. The result of blood reservoir examination in Pasaman Barat can be seen in table 2 below.

Table 2. Blood test results at the reservoir at the research site in Pasaman Barat

<table>
<thead>
<tr>
<th>Location</th>
<th>Kind of Animal</th>
<th>Number examined</th>
<th>Positive Brugia</th>
<th>Positive Dirofilaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katiagan Village, Kinali Sub district</td>
<td>Cats</td>
<td>30</td>
<td>6* (20%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Dogs</td>
<td>16</td>
<td>0 (0%)</td>
<td>2 (12.5%)</td>
</tr>
<tr>
<td></td>
<td><em>Macacau fascicularis</em></td>
<td>1</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Ujunggading Village, Lembah Melintang Sub district</td>
<td>Cats</td>
<td>39</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Dogs</td>
<td>16</td>
<td>0</td>
<td>5 (31.25%)</td>
</tr>
<tr>
<td></td>
<td><em>Macacau fascicularis</em></td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Cats</strong></td>
<td><strong>69</strong></td>
<td><strong>6</strong>*</td>
<td><strong>0</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Dogs</strong></td>
<td><strong>32</strong></td>
<td><strong>0</strong></td>
<td><strong>7</strong></td>
</tr>
<tr>
<td></td>
<td><em>Macacau fascicularis</em></td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*confirm positive *Brugia malayi* PCR

Table 2 shows the results of blood examination in the reservoir 20% of cats examined in Katiagan positive *Brugia malayi* by microscopic test and confirm by PCR. At two sites found dog with dirofilaria 12.5% in Katiagan and 31.25% in Ujunggading.

The mechanism of the implementation of Mass Drug Administration 5-year (first round) plus 2 years (second round) activity is better implemented in the second round there is assistance from RTI (Research Triangle Institute) and the implementation of the drug is drunk in front of the officer. Socialization is also more vigorous done by giving examples of declaration of medicine by the head of nagari/village, health personal and public figures. The implementation of LF mass treatment in Pasaman Barat District has involved cross-sectoral, especially with District Planning and Development Unit (Badan Perencanaan dan Pembangunan Daerah) for planning an action, education office for support giving medicine to school children. Support from district government through Circular Letter and LF entry in Regional Medium Term Development Plan. Head of Sub district, Head of Nagari/village play a role in the accuracy and socialization of the implementation of activities.

The thematic analysis of the head of nagari/village and the ex head of the nagari in both locations indicated that the head of nagari played a role in the socialization of LF treatment, knowing the LF was transmitted by mosquitoes. There is a head of nagari that mentions that there are obstacles in the mass treatment of drugs not taken because they feel pain, like the following quote from Head of Nagari Katiagan [some of people who feel healthy they are not to take medicine, after a little explanation that the disease is transmitted through mosquitoes they are aware and take the medicine].
However, in line with the increase of public awareness, along with the increasing role of cross-sector, the LFMDA program has been completed since the result of the assessment of pre TAS and TAS 1 Pasaman Barat district has passed. In Katiagan, there are activities that can collect all citizens that is during the wedding ceremony or “baralek”. The timing of the execution of “baralek” is timed by customary institutions. Speech by the nagari government on “baralek” activities can also be an information or dissemination effort that can be presented to all citizens. [wedding ceremony is time when all resident gathered, involving all villagers, and head of nagari given time to make speeches]. Quote from one of traditional leaders in Katiagan Village.

**DISCUSSION**

The success of a region in carrying out the massive LF treatment measured through pre-TAS assessment, TAS 1-3 should still be followed by surveillance especially in areas previously designated as sentinel areas. Sentinel area itself is determined by measuring LFendemicity. Selection of samples in pre-TAS surveys, TAS 1-3 conducted in Primary school children aged 6-7 years or in Indonesia around grade1 and 2 Elementary School is done by calculating the sample based on the cluster method of Elementary School. Results of Pre-TAS in PasamanBarat Year 2016 showed Mf rate 0.09%, result of TAS 1 found one positive child of LF antibodies from Ujunggading region. This value does show an improved condition compared to the 2002-2003 survey illustrating the Mf rate range of 1.42% -18.5% with an average of 9.96% . Nevertheless, the sampling method in the selected school TAS selected as a schooling sample also in the endemic areas is unstable as a sample. When the implementation of TAS in KinaliSub district sampled excluding schools in the Katiagan area, however within the range of assessment between TAS should surveillance be maintained and selective treatment in new patients can be done.

The results of this study need to be followed up with selective medicine to residents with positive microfilaria and vector control, especially in Katiagan Village. Another area that pass from TAS1 but the Mf rate from survey more than 1% is Pidie with Mf rate 1.6%, and in Belitung that pass TAS 3 found that Mf rate from survey 1.2%.

Cats positive Brugia malayi also found in Kutawaringin Barat, Aceh Jaya and Pelalawan. Brugiamalayi also found in dog and Macacafascicularis in Kutawaingin Barat, and in Belitung found Macacafascicularis positive B. malayi. The results of examination on captured mosquitoes performed by PCR method showed Mansonia dives, Culexvishnui, Aedescanricomes and Aedesaeegypti reactive to Brugiamalayi. In line with this research, studies show genera Anopheles, Aedes, Culex, Downsnyomia and Mansonia are vector LF in Southeast Asia.

Research conducted in Pasaman Barat habit the use of mosquito nets, dress habits, swamps, home ceiling is a risk factor LF and the most risk is the ceiling of the house. Lymphatic Filariasis is concentrated in the District of Sungai AurNagari Air Haji and Binjai. However, the study did not include timing of implementation. Research in Papua New Guinea found that probably limited resources being wasted on MDA distribution in villages that have lower than threshold prevalence, while possibly missing areas that will require a longer duration of MDA to break transmission.

Katiagan Village not an missing area in MDA but need longer duration of MDA to break LF transmission. Research in Togo District conclude that surveillance after stopping MDA still needed to prompt detect any resurgence and preserve achievement of LF elimination. Lymphatic Filariasis mass treatment for Brugiamalayi was predicted to reduce 83% of microfilaremia, and 34% of lymphedema. Involve of communities on controlling LF have very important role. Build awareness on community about LF and touching all circles and no one marginalized very important. Head of government at all level of government, health staff, customary institutions, customary activity like wedding ceremony can be the entrance to the socialization activities of LF prevention and elimination. Research in Haiti ‘Mosquito Police’ used as approachlarval surveillance with environmental management, social engagement, community education, and larvicide application. The goal of MDA is to reduce the density of parasites circulating in the blood of infected persons and the
intensity of infection in mosquito vector. Learning from the Lymphatic Filariasis situation in Katiagan, post-Lymphatic Filariasis treatment of sentinel areas should be monitored even though the results of the general assessment have passed. Results from the sentinel region with Mf rate > 1% are proposed to conduct additional limited mass treatment in the region for 2 years and give Lymphatic Filariasis selective medicine to people with Lymphatic Filariasis positive. If Lymphatic Filariasis in Katiagan is not immediately handled Lymphatic filariasis control is incomplete and there is opportunity for failure of Lymphatic filariasis elimination in Pasaman Barat if the area is selected in sampling of TAS.

CONCLUSION

In general, MDA LF in Pasaman Barat has indicate succeeded in reducing filariasis rate, but in Katiagan still endemic, this can be a threat for MDA LF in Pasaman Barat.

Conflict of Interest : Authors report no conflict of interest in this work.

Ethical Clearance : Obtained from Banjarnegara Health Research and Development

Source of Finance : Banjarnegara Health Research and Development Unit Class 1

REFERENCES

3. --------. Permenkes RI No.94 tahun 2014 tentang penanggulangan filariasis. 2014;1–118.
5. --------. Brugia Rapid, Test for diagnosis of Brugian filariasis. 2012;0(November). Available at: www.filariasis.us/resources.html.
18. Dorkenoo MA, Bronzan R, Yehadji D, et


Spatio-Temporal Factors Related to Dengue Hemorrhagic Fever in Makassar City, 2010 – 2014

Hasanuddin Ishak¹, Anwar Mallongi¹, Isra Wahid², Imam Bachtiar³

¹Department of Environmental Health, Faculty of Public Health, ²Department of Parasitology, Faculty of Medicine, ³Graduate School of Public Health, Faculty of Public Health, Hasanuddin University

ABSTRACT

Dengue Hemorrhagic Fever (DHF) is an infectious disease caused by the dengue virus is still a public health problem all over the tropics and sub-tropics in the world because it happens every year with a case that is always high. This study aims to describe the spatio-temporal pattern of dengue hemorrhagic fever (DHF) cases in Makassar city in 2010 to 2014, and to analyze the correlation between DHF cases and rainfall rate, larve-free rate, and population density in Makassar city. The research used an ecology study design. The samples, using a total sampling method, were people suffering from DHF (microscopic confirmed) listed in the monthly report of DHF cases in Makassar Health Office from 2010 to 2014. The total number of was 757. This research was conducted from September to November 2015. The data were analyzed spatially (with Moran index), temporally (using graphs), and statistically (using Spearman-rho correlation test); and were processed using ArcGIS 10.3 and IBM SPSS version 20 programs. The results show that the spatial pattern of DHF cases in Makassar city shows a clustered pattern (Moran index = 0.043259). The temporal tendency shows an increase at the beginning of rainy season (January to July) and a decrease at the end of the year after the rainy season (August to December). Based on the statistical test, there is a significant correlation between rainfall rate and DHF incidence (p=0.000 < 0.05). However, there is no significant correlation between DHF cases and larva-free rate (p=0.502 < 0.05); and between DHF cases and population density (p=0.440 < 0.05).

Keywords: Spatio-temporal, Dengue Hemorrhagic Fever, Makassar City, Environmental Factors

INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is a major public health problem throughout the tropical and sub-tropical regions of the world. Based on the WHO report on the number of DHF cases in 30 countries that endemic DBD in 2004 - 2010, Indonesia is the second most endemic country in the world¹.

Since the incidence of Dengue Hemorrhagic Fever (DHF) cases in Indonesia in 1968 in the form of outbreaks in Jakarta and Surabaya, there is a tendency of increasing DHF cases every year. The fluctuation of DHF case reports were published by the Ministry of Health of the Republic of Indonesia during 2010-2014. In 2010 there were 156,086 cases reported or Incidence Rate of 65.7 per 100,000 population and Case Fatality Rate of 0.87%), 2011 reported cases of dengue fever decreased to 65,725 cases (IR of 27.67 per 100,000 population and CFR of 0.91%), 2012 reported cases of dengue fever of 90,245 cases (IR of 37.11 per 100,000 population and CFR of 0.90%), in 2013 cases of dengue fever reported increased to 112,511 cases (IR of 45.85 per 100,000 population and CFR of 0.77%), and in 2014 reported cases of dengue decreased to 100,347 cases (IR of 39.80 per 100,000 population and CFR = 0.90%)².

Environment is an important factor in the spread of dengue fever. Climate change can affect the pattern of infectious diseases and as the risk of increased transmission of disease. Based on Zubaidah (2012) study, rainfall variable has the most dominant influence on DHF case. In addition, based on Hasyim’s³ study, DHF spread follows a certain spatial distribution pattern, cases will tend to increase in areas with high rainfall determinant characteristics, high population density per km2, and low coverage program of Larva-Free Rate.
One of the best ways to design better dengue fever prevention programs is to do spatio-temporal analysis using Geographic Information System. The existence of spatial analysis can be used to see the pattern of DHF transmission in each urban village, so that the map can be used for decision making and policy in the prevention of dengue disease. The purpose of this research is to find out the spatio-temporal pattern of dengue cases in Makassar city during 2010 - 2014 and to analyze correlation between rainfall, larva free number, population density with DHF incidence in Makassar city.

MATERIALS AND METHOD

This research was conducted in Makassar city consisting of 14 sub-districts, 143 urban villages and 46 public health centres. The study was conducted from September to November 2015. The study was conducted using an ecological study design. The variables in this research are rainfall, larva free rate and population density. The population in this study were all residents who had suffered DHF in Makassar during 2010-2014. Determination of the sample in this study was conducted with total sampling, then the sample in this study is the population who suffered dengue microscopically confirmed in the monthly report of dengue cases in the Health Office of Makassar City during the year of 2010-2014 which amounted to 757 people. Secondary data obtained from Makassar Health Office, Local Meteorological Stations and BPS Makassar. Data were analyzed spatially (Moran Index), temporally (graph), and statistically univariate with frequency, bivariate with Spearman-rho correlation test. Data were processed using ArcGIS 10.3 and IBM SPSS version 20 programs.

RESULTS AND DISCUSSION

Spatial Pattern of Dengue Hemorrhagic Fever

Based on Figure 1 in general can be seen spatial distribution of Dengue hemorrhagic fever case based on urban village during 2010 - 2014 gathered in downtown of Makassar. This Figure 1 which shows that the 3 highest urban villages each year in Makassar city during 2010 - 2014 are mostly in countryside of Makassar city. Spatial analyzed by using Moran Index (Figure 2) was obtained value of 0.043259. It means there is spatial autocorrelation (cluster pattern) dengue hemorrhagic fever in Makassar city. Cluster pattern means there is linkage of DHF incidence among urban villages that become research location.

This study is in line with the research of Naish et al\(^4\), that there is a spatial autocorrelation of dengue hemorrhagic events in North Queensland Australia. This study is also in accordance with Wahyuningsih\(^5\) and Nurazizah\(^6\) research, that spatial analysis has shown the pattern of DHF incidence spread clustered. Research conducted by Davis et al\(^7\), states that the pattern of known DHF spread through spatial analysis can be used for the prevention of DHF outbreak by conducting an investigation that leads to the source found. Information on the pattern of the spread of DHF events can be used to strategize health program interventions and can be utilized for DHF control efforts by region. This is not in line with Jumiati’s \(^8\), and Farahiyahet al\(^9\) studies, which says that the spatial pattern of dengue has a random pattern which is dengue cases that tend to spread throughout the village. This is also not in accordance with the research of Pei-Chih et al\(^10\), which states that the pattern of DHF cases spread in the area of his research, this spread pattern can be caused by various factors contained in a region. The pattern of the spread of this case is likely due to the activity pattern of Makassar people who have been actively doing housing development on the outskirts of Makassar. These developments cause problems such as creating new water puddles from former building materials or construction excavations. This is in line with Anno et al\(^11\) study, that one of the causes of the outbreak of dengue fever is due to changes in land cover, rapid expansion of urban areas with inadequate housing and infrastructure. Rapid expansion of poorly planned urban areas leads to inadequate water shortages, sewers and waste management. The lack of sufficient urban water supply in urban areas as it often causes residents to store water in large open containers, such as clay jars and reservoirs. Automobile tires, plastic containers and other forms of construction debris in dense urban environments result in the large pool of water that becomes mosquitoes breeding habitat.
Temporal Trend of Dengue Hemorrhagic Fever with Rainfall

Temporal pattern of dengue hemorrhagic fever is based on the result of graph analysis in the form of time trend line graph, based on the data of dengue cases during 2010-2014. Temporal pattern of dengue hemorrhagic fever cases with monthly rainfall in Makassar city during 2010 - 2014 shows that there is a relationship between the pattern of dengue hemorrhagic cases increased in line with increased rainfall. Visible on (Figure 3) during 2010 - 2014 dengue fever cases began to increase in January (14.4 average cases) as well as rainfall peak occurred in January (813.6 mm average rainfall), therefore the pattern of increased DHF cases are in line with decreasing rainfall patterns. Range of monthly period of process of increasing of dengue case happened in period of January - July while pattern of decrease of dengue case average happened in August - December. This pattern explains that the average dengue fever case starts at the beginning of the rainy season to dry season. While the peak average case of dengue occurs in July which is the turn of the rainy season into the dry season.

Spearman-rho correlation test results show that there is a significant relationship between rainfall (p-value = 0.000 <0.05) with the incidence of DHF.

This research is in line with Iriani\textsuperscript{12} research, in Palembang city where the result says that the peak rainfall anomaly from the annual average will be followed by the peak change of dengue cases. The peak of rainfall also occurs at the same time as the peak of dengue cases. Rainfall correlates with the occurrence of DHF, the strongest correlation with DHF cases at the peak of rainfall. The peak monthly rainfall coincides with the peak month of dengue fever case and peak rainfall change in line with the peak change of dengue cases. In addition, the results of this study are in line with the Jumiati\textsuperscript{8} study, indicating that the temporal tendency of DHF tends to increase at the beginning of the rainy season in January, February, March, and...
December and decreasing cases at the end of the rainy season or during the transition to the dry season (east season) in August, September, and November. This study shows that there is a significant correlation (p = 0.000 <0.05) between rainfall and dengue hemorrhagic fever cases. This research is in line with research conducted by Wirayoga\textsuperscript{13} and Zubaidah\textsuperscript{14}, showing that there is a significant relationship between rainfall and dengue incidence. Heavy rainfall and floods can exacerbate inadequate sanitation systems in many slum areas in different regions and cities, thus making communities vulnerable to disease. Rainfall will contribute to the availability of suitable habitats for vectors to multiply, impacting on vector populations. Hau et al.\textsuperscript{15} shows that the risk of dengue fever increases during the rainy month when monthly rainfall increases along with an increase in vector population. The availability of vector habitats such as standing water as a breeding ground can lead to a vector population explosion that can increase the DHF incidence rate in an area. Rain can affect the life of mosquitoes in 2 ways, namely: causing the rise of air relative humidity and increase breeding places.

**Correlation of Larva Free number with Dengue Hemorrhagic Fever**

Spearman-rho correlation test results showed that there was no significant correlation relationship between larva free number (p-value = 0.502 > 0.05) with the incidence of DHF. This research is in line with Asmara\textsuperscript{16} and Prasetyo&Satoto\textsuperscript{17} studies, which showed that there is no relation (p-value 1,000) between larva free rate and DHF incidence. Free larva housing number is one measure to know the larva density of \textit{Aedes aegypti} mosquito so that can give indicator of vector disease development of Dengue Hemorrhagic Fever in a region. The more larva found, it can increase the risk of DHF transmission. The low Free larva housing number illustrates the lack of active participation of the community in eradicating mosquito breeding, thus increasing the \textit{Ae. aegypti} population and the occurrence of DHF transmission. Therefore, early warning is needed to increase Dengue cases and dengue risk factors, such as: an increase of mosquito population, decrease of Free larva housing number <95%, weather change, and increase of breeding places.

**Correlation of Population Density with Dengue Hemorrhagic Fever**

Spearman-rho correlation test results showed that there was no significant correlation relationship (p-value = 0.440 > 0.05) between population density and DHF incidence. This study is in line with the Sawaku\textsuperscript{18} and Sihombing et al\textsuperscript{19,20} studies, indicating that there is no significance relationship between population density and the DHF incidence. Population density is not the main cause of dengue fever. But population density is an important risk factor in the development of viral diseases. In addition, since dengue fever is transmitted by the \textit{Ae. aegypti} mosquito vector that has an average flying range of about 100 m, a densely populated population will accelerate the spread of DHF.

**CONCLUSIONS AND RECOMMENDATIONS**

This study concluded the Dengue hemorrhagic fever in Makassar city has cluster pattern, tends to occur at the beginning of the rainy month and at the end of rainy season. Factors that significant correlate with dengue cases are rainfall (p = 0.000 <0.05). This research suggested to Health Office of Makassar City to take precautions such as spraying (fogging), mosquito breeding eradication, or more activate larva Monitoring Cadre at the time before or early of rainy season so there is no increase of dengue cases at peak rainfall or after because mosquito and its breeding site has been eradicated first before entering at its optimum time to breed. Suggestion to the community is expected to be alert and participate actively participate in mosquito breeding eradication and self protection from mosquito bites in period of increasing of dengue case that is period of January - July.

**Ethical Clearance**- Taken from University committee

**Source of Funding**- Hasanuddin University

**Conflict of Interest** – None

**REFERENCES**


The Use of Owner House ID Card to Increase Effectiveness of Monitoring Larva Visit by Jumantik

Mochammad Choirul Hadi1, Ni Made Marwati1, I Gusti Ayu Made Aryasih1, Dewa Ayu Agustini Posmaningsih1, I Nyoman Sujaya1, Anwar Mallongi2

1Environmental Health Department, Polytechnic of Health Denpasar, Bali, Indonesia, 2Lecturer of Environmental Health Department, Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi Indonesia

ABSTRACT

Some of the factors causing the ineffectiveness of larval monitoring are the discipline of the officers, the complicating factors, the laxness of supervision, or perhaps even the high targets. This study aims to analyze the effectiveness of the use of ID numbers of residents and stickers to improve the monitoring of Larva Monitoring Officers (Jumantik). This research is an operational research with an analytical method designed to assist program managers in choosing one of the various alternative problem-solving health services with a specific purpose. From the results of the research was known the width of the range of home visits by the officer depends on the instructions they received from the supervisor. The use of the number of ID card or family as Personal Identification Number (PIN) from homeowner visited will “force” the officer to approach the homeowner. The “proximity” factor between officers and the homeowner accompanied by rational targeting is able to increase the number of home visits by the larva monitoring officer.

Keywords: identity; larva monitoring; home visits

INTRODUCTION

Larva monitoring officers (Jumantik) which are considered by the community as the “squad” leader who directly combats the vector of Dengue Hemorrhagic Fever (DHF). Various existing studies, which try to criticize the existence of officer already quite a lot. Sudiadnyana once highlighted the performance of officer in Tabanan regency which cannot be optimal because of less training from District Health Office.1 Similarly, the public spotlight on the existence of this officer was recorded in mid-August 2012, the residents of West Denpasar asked about the activities of the officer. The residents asked why their settlement have not been visited by the officer for along time.2

Sali and Sudiadnyana also found the new officer problems who has to do face to face counseling, an officer not yet have to conduct counseling to a group of people.3 Hadi’s research found that there were still some Community Health Center whose its officer cannot work optimally, with the output of larvae free is still below 95%. This is due to ineffective larvae monitoring activities because there were still officers worked under the target, as many as 30 homes/person/day. Some of the factors contributing to the above incidents were indiscipline, the complicating factors of visiting, lax supervision, or perhaps even the high targets.2

This study aims to analyze the effectiveness of the use of PIN and stickers to improve the monitoring of officer home visits in its contribution to reduce the morbidity rate of DHF in Denpasar, Bali, Indonesia.

MATERIALS AND METHOD

This research was a prospective study and an operational research with an analytical method designed to assist program managers in choosing one of the various alternative problem-solving health services with a specific purpose as suggested by M.E. Beatty, et al.4

As population research was all family that exists in Pedungan Village as the work area of Health Center IV South Denpasar 5,743 families spread in 14 sub-villages...
Identify larvae

The number of positive containers found mosquito larvae in the homes of residents at each stage there was a tendency more and more found. Especially in stage III when the students get involved in observing the presence of mosquito larvae in containers that exist in the house of the family that became the target of the officer. The emergence of the fact that the increasing number of positive larvae containers can be caused by the increased activity of mosquitoes during the third phase of the research (rainy season), or it may be due to the increasing number of observations made by officer together with the students who assist the research.

The Case of Dengue Hemorrhagic Fever

Based on the records at the Health Center during the year 2016 almost every month reported a case of DHF, except in January 2016. In February the cases began to appear and directly increased in March to May 2016. It appeared that most banjar high number of DHF patients were Karang Suwung, Pitik, and Ambengan. While the most frequent banjar dengue cases were at Karang Suwung, Pitik, and Pande.

Furthermore, from Figure, it appears that there were seven banjar (50%) with House Index (HI) above 5 or that have a Free Number of Larvae less than 95% ie Kaja, Dukuh Pesirahan, Geladag, Pitik, Begawan, Pande, and Puseh.

DISCUSSION

PIN assignment completion time

The acceleration of completion of tasks at each stage of the officer visit of the 40 houses assigned to them. In stage I they completed the targets charged to them on average four days. Some officer expressed their difficulties to meet the head of families to borrow an ID
card to be used as a PIN on a card that will be left at home visited. These constraints were the reason why they took so long to meet their targets, only 4 out of 14 people (28.6%) can complete the target visit within 2-6 days.

In stage II the officer finish their task on average within 3 days, one day faster than at stage I. Although the time span of completion of the task was the same, between 2 - 6 days, 8 out of 14 people officer (57, 1%) do the task within 3 days. Constraints faced by the officer in tasks in phase II this is a matter of time. During the execution of the task of stage II Balinese people are busy with the activities of holiday, so they worked at shorter time. In stage III, the assignment of completion of the 40th visit target of the house was determined by the researcher within two days, but they were given a choice of four days. It turns out that all officer succeeded in fulfilling the set target within two days.

Number of home visits on the first day

The number of houses visited on the first day in phase I and II was almost no different, but in phase III the number of houses visited on the first day increased to 60 houses (30%). In terms of range the number of home visits in phase I and phase II conducted by officer is similar, that is in the range of 6 - 20 houses, while in phase III the number of home visits reaches optimally (20-23 houses) they use, ie only two days.

In stage III, the number of houses visited during the first day visit can be high (285 houses) compared to phase I and phase II, since all officer are trying to meet the set time target. Within that time set by accompanied by a student every officer turns out they can meet the target to monitor larvae to the house of citizens as much as 20 houses in a day. This fact was in line with research conducted by Sandi about the significance of the influence of supervision on the performance of officer.

Number of containers found

The number of containers found at the visited house in phase I up to stage III shows the addition, from 2,404 containers to 2,625 containers, or an increase of 221 containers. In phase I the average number of containers found in stage III by the officer increased from 172 to 188 containers or increased by 9.3%. The presence of students or third parties in the implementation of larva monitoring task has made officer want to work better.

This is in line with the conclusion of Sandi’s research that sees the strong role of direct supervision in improving the performance of the officer.

To compared to conditions elsewhere such as Cebu City, Philippines, in 2004 the Container Index (CI) is at 14.44 - 55.37. In South India, in February 1998 the CI was there in the range of 4.02 - 13.73. Five areas in Jakarta, in January 2007 the CI is in the range of 0.27 to 2.34. In Semarang, Central Java, the CI in February 2008 in the range 0,11 – 0,14. In Dire Dawa, East Ethiopia, in October 2014 reported CI is in the range 23,18 - 73,91. CI in Pedungan village, Denpasar, can reach the lowest because of 2016 in the range of 0,0 - 4,6.

Free Figures and Cases of DHF

In Figures 1 and 2 obtained from the data collection of Phase III (dated 15, 16, 22 and 23 October 2016) found 50% of the Banjars in Pedungan Urban Village have Free Number of Larvae less than 95% of the Banjar: Kaja, Dukuh Pesirahan, Geladag, Pitik, Begawan, Pande, Puseh. And when connected between the ABJ with the number of cases of dengue, we see that there are two Banjars with the highest dengue cases appear in Banjar with high ABJ also, namely Karang Suwung and Ambengan. It can be explained that the working area of Aedes aegypti mosquitoes is not affected by the administration area. It could be that the patient had an infection from outside the village or there was a positive container missed by officer monitoring, as found by Andriyani in North Jakarta.

Compared to other places, half of its territory Pedungan Village has reached free number of larva (ABJ) more than 95, such as Semarang City in Central Java in February 2008 there is no village which stated have ABJ more than 95. Semarang by 2013, the free rate of larvae reaches 55%. This ABJ has not been used outside Indonesia, the size that is often used to see free larvae used Breteau Index (BI) beside Container Index (CI) and HI (House Index). BI in Pedungan Village is 0.0 - 17.5, while in other places like South India 0.29 - 33.87 (Tewari et al., 2004), in Cebu City, Philippine BI figures reached 50-230 in 2004 (Mahilum et al. 2005). This index is interpreted the greater the value of BI increasingly risky environment in the region, reversed with the number of free larvae the greater the value the better the environment.
While Banjar Ambengan which has 1,015 families visited in 68 days, or 12 weeks, or three months. Thus the Ministry of Health’s instructions for each family can be visited once every four months is possible to implement.  

In stage II which is carried out by requesting the Supervisor to provide stickers written down date to the field was able to control larva monitoring activities by the officer. The target number of visits agreed with officer and the gave officer the opportunity to measure themselves how much they could make a visit to the residents’ house at that time.  

In stage III when the researchers also sent 14 students to assist the officer in doing its duty to monitor the existence of larvae. Joint observation between officer and students resulted in a good cooperation synergy, as evidenced by the increasing number of containers that were successfully found as much as 9.3%. The key to the prevention of DHF is a strict monitoring of the results of officer’s performance reporting that visits each home at least every three months. The results of the monitoring are processed into numbers in HI, CI, and BI formats, as well as the Freely Numeric Rate (ABJ) can be used as a tool to see the environmental quality of DHF threats. The best performance expected from the officer is the increasing ABJ and continues to decrease the Incidence Dengue Rate. 

CONCLUSIONS

There were 14 people Officer at Health Center IV South Denpasar, Bali carrying out monitoring of larvae from house to house during their working hours (at 8:00 to 12:00 pm) of 6-23 houses in one day. In one-day event coordinator or supervisor capable of supervising the implementation of the monitoring officer against 5 of the 14 officer (35.7%) in their working area. The use of the ID card number or family numbers homeowners as PIN and stickers on a visit card capable “force” officer approach to home owners.

Ethical Clearance: Obtained from the Health Center and responden agreement

Conflict of Interest: All author declare that there is no any conflict of interest within research and publication including the financial agency.

REFERENCES


Administration of Tempehethanol Extract on Prenatal Until Weaning Period Inhibit the Ovary Follicles Developing of Little Wistar Rats

Ni Nyoman Budiani¹, Ni Ketut Somoyani¹, Gusti Ayu Marhaeni¹, Gusti Kompiang Sriasih¹, Luh Putu Sri Erawati¹, Anwar Mallongi²

¹Lecturers of Midwifery Department, Health Polytechnic, Indonesia Ministry of Health Denpasar Bali, Indonesia, 
²Professor of Environmental Health Department, Faculty of Public Health, Hasanuddin University, Makassar

ABSTRACT

Background and objective: soybean tempeh contains isoflavones that are able to bind to estrogen receptors, so they have estrogenic properties. This study aims to prove that the administration of tempeh soybean extract during periods of perception can inhibit the formation of ovarian follicles. Method: posttest only control group design, using female rats aged 12-13 weeks with BB 150 g, a research site in Udayana University’s integrated laboratory. Result: the results showed that there were significant differences in the mean number of follicles in the three groups, namely primordial, primary, secondary was p<0.01; atretic follicles was p<0.05. Conclusion: the administration of ethanol extract of tempeh during the perimenopause period can inhibit the formation of primordial follicles, primary follicles, and secondary follicles. High doses can increase the average number of atretic follicles. Keywords: ethanol extract tempeh, perimenopause period, ovarian follicles

INTRODUCTION

Infertility is a failure of couples gets pregnant after sexual intercourse routinely without contraception for 12 months. Basic Health Research data 2013 found 43.2% married couples do not use contraception because they want children¹. World Health Organization (WHO) estimates that 10-15% of couples in the world experience infertile². The cause of infertility due to ovulation disorders of 27%, and 25% due to spermatozoa disorders³.

Ovulatory disorders can occur because of the lack of proper follicles to be recruited and selected so that the follicle is ready for ovulation is also less likely to be absent. Problems with follicular development may occur during the period of perception, ie before, during, and after conception. This period as a critical period is sensitive to exposure or events that interfere with the physiology of cells, tissues or organs⁴.

The primordial germ cells in the fetus, arrive in the gonads and undergo sexual differentiation at 4-6 weeks gestation. Ovum differentiation requires the activity of the Y-group sex genes (SRY) to promote ovarian development by suppressing Sox9. The germ cells in the ovaries experience mitosis rapidly so that the amount of oogonia multiplies. Oogonia is converted into a primary oocyte followed by meiosis as well as the development of its wrapping cells to form a primordial follicle and then develop into primary follicles to preovulatory follicles²⁵.

The recruitment of oocytes into primordial follicles is triggered by germ cells apoptosis, which begins at 13.5 post-coitus days in rate, due to decreased levels of estrogen and progesterone in pregnancy⁶⁷. In addition to estrogen and progesterone hormone levels, genistein administration of 50 mg/kg BW/day for five days in 1 day-old rats also inhibits oocyte nest break and recruitment of primordial follicles⁸.

A large number of stimulated follicles grows and subsequently develops atresia, causing fewer primordial follicle reserves⁹. The process of apoptosis is controlled
by various cell signals, such as hormones, growth factors, nitric oxide and cytokine. Other factors such as nutrient intake and free radicals. Pregnancy increases oxidative stress due to high metabolic activity, characterized by increased placental lipid peroxide and decreased expression of antioxidant enzymes. Soybean tempeh is one of the foods that have been consumed for generations. Soybean tempe contains protein, carbohydrates, fats, vitamins, minerals, and fiber. In addition, it contains isoflavones consisting of daidzein, genistein, and glycitein. The hydroxyl group possessing isoflavones is antioxidant. Genistein and Daidzein can be transferred to the fetal body. The compound is also found in the stomach of infants after suckling on its mother who gets soy isoflavone. This study aims to prove that, giving ethanol extract of tempeh able to influence the formation of primordial follicles, primary follicles and atresia follicles.

**MATERIALS AND METHOD**

**Animal**

Female Wistar rats aged 12-13 weeks, healthy, selected as many as 18 tails with an average body weight of 150 grams. Wistar male rats aged 16-18 weeks selected 9 tails with an average weight of 190 g. The mice were obtained from the UNUD Integrated Biomedical Laboratory. Material enclosure is a plastic box, measuring 40 cm x 15 cm x 10 cm. Each cage is equipped with a feeding and drinking place that is cleaned and replenished daily. The condition of the cage is kept clean, dry, good air circulation, stable room temperature, and calm atmosphere.

Acclimatization is done for one week, the rats are given adjust to the light-dark cycle, covering 12 hours of light: 12 h dark. Rats were given refill drinking water in ad libitum, and standard feed 12-20 g per day. If anyone is sick, the mouse is removed from the study sample, then treated.

**Chemical material**

The soybean tempeh made by researchers from the local soybean varieties of Wilis, fermented for 48 hours. The tempe was extracted using 96% Ethanol and then the Freezy dryer was done. Every 100 g tempeh yields 4 grams of viscous extract, containing 1.04 mg / g of Genistein tested using thin layer chromatography (KLT) -Spektrofotodensitometri. The extract also contains Phenol 70.25 mg per 100 g GAE (Gallic Acid Equivalent), antioxidant 152.31 mg / L GAEC (Gallic Acid Equivalent antioxidant capacity). Each 100 g of wet weight, containing 1.53 g water content, 0.22 g of ash, 1.94 g protein, 80.43 g fat, and 15.89 g of carbohydrate.

**Research design**

Female rats were randomized after acclimation, divided into 3 groups, ie control (C) given aquadest 0.3 mL; treatment 1 (T1) was given extract of tempeh 0.1 g/kg BW/day; treatment 2 (T2) was given tempeh extract 5 g/kg BW/day. Each group numbered 6 tails. Treatment is administered orally via sonde, daily from 9:00 to 10:00 AM. Determination of dosage refers to the study of Lofamia et al (2014). Treatment duration is about 56 days, covering 14 days before mating, about 21 days during pregnancy until the pup is born, and 21 days during breastfeeding.

Dam rats mated, in one cage placed 1 male versus 2 females. The dam rat was found pregnant after a vaginal plug (+) was found. Pregnant rats are returned to their respective enclosures until weaning. Male rats are kept in one stable with their dam and pups siblings. The rats were separated from their dams by age 21, randomly selected each of 2 females and males little rats per dam. The females were examined for this study, while the males were used for other studies. Selected little rats, euthanasia with cervical dislocation method. Surgery to take the ovaries of female little rats, followed by histopathological examination.

**Gonadal tissue preparation**

The ovaries taken from the little female rats were fixed in a 10% formalin solution. The fixed tissue is processed, with the Meyer hematoxylin-eosin (HE) staining. Preparation done according to standard in a laboratory of pathobiology Faculty of Veterinary Medicine of Udayana University.

**Sample histological observation**

Observations Primordial follicles, primary follicles, and follicular atresia were performed using the Olympus BX 51 brand microscope, the number of cells counted at 5 fields of view. The observations were conducted in the pathobiology laboratory of the Faculty of Veterinary Medicine of Udayana University.

**Statistical analysis**
Statistical analysis includes descriptive analysis. Comparative analysis using Independent t-test, ANOVA, after all data has the normal distribution. Data analysis using computer assistance, using 95% confidence level (p < 0.05).

RESULTS

A total of 18 rats were observed, but drop out 3 tail, that is each group of 1 tail. In group K, the mother rages and wounds her child; T1, sick mother; T2, the mother refused to breastfeeding. The number of female children observed per parent is 2 little rats (10 little rats each group).

Comparison of the number of Primordial Follicles, Primary Follicles, Secondary Follicles, and Atretic Follicles

Figure 1. Mean of Primordial Follicles, Primary Follicles, Secondary Follicles, and Atretic Follicles

Figure 1 shows that the average number of primordial follicles, primary follicles and secondary follicles was lower in the treatment group (T1 and T2) versus control (C), while the number of follicular atresia lower in group C than treatment. To know the differences between the three groups and the differences between groups, One Way Anova analysis was performed. The results of the analysis are presented in table 1 below.

Table 1. Difference Count of Primordial Follicles, Primary Follicles, Secondary Follicles, and Atretic Follicles

<table>
<thead>
<tr>
<th>Follicles</th>
<th>Between Group</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primordial</td>
<td>C-T1</td>
<td>0.000*</td>
</tr>
<tr>
<td></td>
<td>C-T2</td>
<td>0.000*</td>
</tr>
<tr>
<td></td>
<td>T1-T2</td>
<td>0.000*</td>
</tr>
<tr>
<td>Primary</td>
<td>C-T1</td>
<td>0.002*</td>
</tr>
<tr>
<td></td>
<td>C-T2</td>
<td>0.000*</td>
</tr>
<tr>
<td></td>
<td>T1-T2</td>
<td>0.171</td>
</tr>
<tr>
<td>Secondary</td>
<td>C-T1</td>
<td>0.023*</td>
</tr>
<tr>
<td></td>
<td>C-T2</td>
<td>0.000*</td>
</tr>
<tr>
<td></td>
<td>T1-T2</td>
<td>0.064</td>
</tr>
<tr>
<td>Atretic</td>
<td>C-T1</td>
<td>0.632</td>
</tr>
<tr>
<td></td>
<td>C-T2</td>
<td>0.013*</td>
</tr>
<tr>
<td></td>
<td>T1-T2</td>
<td>0.038*</td>
</tr>
</tbody>
</table>

*p* significant p<0.05

Table 2 shows that the comparison of the number of primordial follicles, primary follicles, and secondary follicles between groups of C with T1 and group C with T2 is significantly different. The comparison of primordial follicular and follicular atresia between T1 and T2 groups was significantly different, while the mean of primary and secondary follicles did not differ. Comparison of mean of follicular atresia between group C with T2 and T1 with T2 was significantly different, whereas C with T1 was not different.
DISCUSSION

In this study, there appears to be an inhibit of recruitment of primordial follicles which causes the number of follicles to be less than the number of primordial follicles of control group of little rats. In this study, tempeh ethanol extract given containing isoflavones (genistein 1.04 mg/g extract) and flavonoids may cause estrogen levels remain high until late pregnancy and postpartum, so as to inhibit the breaking of the oocyte nest. In addition, the antioxidant properties of isoflavones may also be capable of inhibiting germ cell apoptosis. Both of these events (inhibit of oocyte nest breakdown and apoptosis) lead to the recruitment of primordial follicles to be inhibited as well, resulting in the number of primordial follicles becoming slight.

The results of this study are in line with the opinion, that the effect of genistein exposure on ovarian development of little rats, is unfavorable. At birth, rats have large oocyte nests, and during the first week of life, these oocyte nests dissociate into individual oocytes surrounded by granulosa cells. This process of ovarian differentiation requires decreased estrogen and progesterone postpartum. Neonatal treatment with estrogens such as 17β-estradiol and genistein interferes with this process. Giving genistein injection 50 mg/kg BW/day for five days in 1 day-old rats inhibited...
the breakdown of the oocyte nest and the recruitment of primordial follicles. Administration of genistein subcutaneous injections of 50 mg/kg BW/day for three days in 18-21 day-old rats caused the number of primordial follicles and fewer primary follicles than the control group.

Primary follicles are a further development of primordial follicles characterized by the change of pregranulosa cells into granulosa surrounding the oocyte. Under the influence of growth factors and other factors, primary follicles develop into secondary follicles, characterized by oocytes surrounded by several layers of granulosa cells. Once the primordial follicle is formed, the oocyte begins to meiosis. Oocytes develop through meiosis I to the diplotene stage of prophase.

The number of follicles of atresia was highest in the high-dose treatment group (T2). The number of follicular atresia in the group was significantly different with the low-dose treatment group and the control group. The results of this study support the finding that the administration of subcutaneous genistein increases the number of follicular atresia in large follicles and small follicles. Giving 100 mg of soy isoflavone/kg BW/day increases the number of cells in the antral follicle having atresia in mice. Increased incidence of atresia may be associated with increased apoptosis in the follicle due to low levels of FSH. Isoflavone administration may increase serum estradiol levels. This may provide negative feedback to the pituitary so that FSH levels become low and inhibit the expression of FSH receptors. This phenomenon occurs because of increased levels of protein factor apoptosis caspase3, FAS, BAX, combined decreased levels of protein factor antiapoptosis BcL2.

This study is consistent with the findings of Budiani et al., that the administration of Genistein during the periconception period results in inhibition of leydig cell, sertoli and spermatogonia cells formation in male little rats.

CONCLUSION

This Study conclude that the formation of primordial, primary, and secondary follicles is inhibited in Wistar rats who received exposure to tempehethanol extract (high and low doses) since the preconception period. However, follicular formation of atresia is triggered by high doses.

Conflict of Interest: All author declare that there is no any conflict of interest within this research and publication including the financial agency.

Ethics: The research ethics from committee of Udayana University Medical Faculty / Sanglah Bali General Hospital.

REFERENCES


Combination of Vimentin, E-Cadherin, CD44 and CD24 Expression as Predictor Model of Anthracycline Base Neoadjuvant Chemotherapy Response to Stage IIIB Luminal Breast Cancer

Bachtiar M Budianto¹, Bambang Pardjianto², Edy Mustofa³, Setyawati Soeharto⁴, Solimun⁵

¹Department of General Surgery, Saiful Anwar Hospital Malang, Indonesia, ²Medical Department, Universitas Islam Negeri Maulana Malik Ibrahim, Indonesia, ³Department of Obstetrics and Gynecology, Saiful Anwar Hospital Malang, Indonesia, ⁴Medical Faculty, Universitas Brawijaya, Indonesia, ⁵Engineering Faculty, Universitas Brawijaya, Indonesia

ABSTRACT

Breast cancer is the most common cancer in women in developing countries. This study is an experimental research with a pre-experimental type aimed at analyzing the potential expression of Vimentin, E-Cadherin, CD44, and CD24 as a biomolecular predictor of neoadjuvant chemotherapy response in stage IIIB luminal breast cancer at Dr. Saiful Anwar General Hospital Malang, Indonesia. A total of 35 patients were given neoadjuvant chemotherapy. Expression of Vimentin, E-Cadherin, CD44, and CD24 was examined and analyzed immunohistochemically. Data obtained by immunohistochemical examination and analysis were processed statistically using variance analysis (ANOVA) generated by the SPSS program for Windows. The results showed that neoadjuvant chemotherapy treatment can decrease Vimentin and CD24 expression and increase E-cadherin and CD44 expression. This study concluded that the combination of Vimentin, E-cadherin, CD24, and CD44 expression may be further used as a predictor of anthracycline-based neoadjuvant chemotherapy response in patients with stage IIIB malignant breast cancer.

Keywords: Breast cancer, vimentin, e-cadherin, CD24, CD44, neoadjuvant chemotherapy.

INTRODUCTION

Breast cancer is one most common cancer in women, leading to death and having an increased incidence from time to time. In Indonesia, in 2013, 61,000 new cases of breast cancer were found¹. Data from the Jakarta Cancer Registry show that breast cancer is the most incident cancer with an incidence of 18.6 per 100,000 people in a year². One of the management of advanced breast cancer is neoadjuvant chemotherapy.

Neoadjuvant chemotherapy is chemotherapy given prior to primary therapy in the form of surgery. Chemotherapy response prediction is currently based on predictors of clinical status of TNM stages (tumors, lymph nodes, metastases), histopathologic outcomes (grading, histopathologic type, lymphovascular invasion) and IHC (immunohistochemistry). The examination of immunohistochemical phenotype (IHC) of ER, PR, HER2, Ki67 has now become standard, but still it also leavesa problem, namely the unresolved resistance.

Neoadjuvant chemotherapy can also cause phenotypic deviation, so there is a need for other protein predictors to measure the chemotherapy response more precisely so that the risk of recurrence and secondary cancer growth can be suppressed. Cell in breast cancer is epithelial cell phenotype integrated one another through the junctional cellular which then will change through the EMT (epithelial to mesenchymal transition) activation. EMT activation will change the character of breast cancer from epithelial cells into mesenchymal...
cells whose cells are separated from one another to be more motile and mobile. Some of the expressed proteins associated with induction of EMT activity have been identified in previous studies, where in the EMT activation process, there is a change in the expression of epithelial and mesenchymal proteins as cancer cell progression markers.

The two proteins can be observed and measured by immunohistochemical examination of breast cancer tissue from biopsy or surgery results. The decreased E-cadherin expression (aberrant expression) is widely associated with the increased tumor progression and metastases, whereas the increased vimentin expression is reported in different types of epithelial cancers, including breast cancers. Vimentin overexpression in tumor cells is associated with increased tumor growth, invasion and poor prognosis.

In addition to the increased Vimentin expression and decreased E-cadherin, Ghuwalewala (2016) mentioned that high CD44 population and low CD24 population are also referred to as characteristics of EMT. Functionally, CD24 can increase the metastatic potential of cancer cells. In some studies, CD24 is formulated as an important marker for diagnosis and assessment of cancer prognosis. In lung cancer, CD24 is an independent marker of survival rate of the patients. Overexpression of high CD44 population and low CD24 population is associated with chemotherapy resistance.

The potential of the EMT cell biomarkers involved in the progression and pathogenesis of breast cancer will be investigated by analyzing the potential combination of Vimentin, E-cadherin, CD44 and CD24 as a model to prove that the four proteins as a whole can serve as predictor for assessing anthracycline-based neoadjuvant chemotherapy response given to the patients with stage IIIB luminal breast cancer in Dr. Saiful Anwar General Hospital Malang. One advantage of this study is: if it can be proven that the predictor of the combination protein of Vimentin, E-cadherin, CD44 and CD24 is a better parameter, it can be used as a basis to provide or continue neoadjuvant chemotherapy in breast cancer.

**MATERIALS AND METHOD**

This study used experimental research design with pre-experimental type. This study measured clinical variables of tumor size before neoadjuvant chemotherapy in biopsy results of patients with locally advanced stage IIIB luminal breast cancer and biomolecular variables of Vimentin, E-cadherin CD44 and CD24 expression of breast cancer tissue prior to chemotherapy. Examination of Vimentin, E-cadherin, CD44 and CD24 was done using IHC (immunohistochemistry) with a monoclonal antibody to the identified proteins. Expression of Vimentin, E-cadherin, CD44 and CD24 was assessed from the quantity of immunostaining, grouped by positive and negative staining reactions, then positive cells were calculated per 100 cells under a microscope with 400x magnification.

**DATA ANALYSIS**

This study used Chi-square test to see the correlation of the independent variables including Vimentin, E-cadherin, CD44 and CD24 expression in stage IIIB luminal breast cancer tissue against anthracycline-based neoadjuvant chemotherapy response. Discriminant analysis test, ie statistical modeling with dependent variables, had categorical data. Data were processed and analyzed using SPSS.

**RESULTS**

There were 35 subjects that met the inclusion criteria during the study.

**Table 1. Characteristics of the participants**

<table>
<thead>
<tr>
<th>Variable</th>
<th>mean±SD</th>
<th>Frekuence</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>49.51±5.28</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Grading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>-</td>
<td>4</td>
<td>11.42</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>15</td>
<td>42.85</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>16</td>
<td>45.71</td>
</tr>
</tbody>
</table>
Continued Table 1. Characteristics of the participants

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tumor size(cm):</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Before therapy</td>
<td>8.51±5.86</td>
<td>-</td>
</tr>
<tr>
<td>After therapy</td>
<td>3.23±2.55</td>
<td>-</td>
</tr>
<tr>
<td>Lymphnode :</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>8</td>
<td>22.86</td>
</tr>
<tr>
<td>Single</td>
<td>20</td>
<td>57.14</td>
</tr>
<tr>
<td>Multiple</td>
<td>5</td>
<td>14.29</td>
</tr>
<tr>
<td>Infraclavicular</td>
<td>2</td>
<td>5.71</td>
</tr>
<tr>
<td>Estrogen receptor (+)</td>
<td>-</td>
<td>35</td>
</tr>
<tr>
<td>Progesteron receptor (+)</td>
<td>-</td>
<td>35</td>
</tr>
<tr>
<td>HER2 :</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>- (negative)</td>
<td>8</td>
<td>22.86</td>
</tr>
<tr>
<td>+ (negative)</td>
<td>20</td>
<td>57.14</td>
</tr>
<tr>
<td>++ (borderline)</td>
<td>5</td>
<td>14.29</td>
</tr>
<tr>
<td>+++ (positive)</td>
<td>2</td>
<td>5.71</td>
</tr>
<tr>
<td>Ki67:</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>28</td>
<td>80</td>
</tr>
<tr>
<td>Low</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Vimentin (%)</td>
<td>30.63±16.02</td>
<td>-</td>
</tr>
<tr>
<td>E-cadherin (%)</td>
<td>48.89±27.79</td>
<td>-</td>
</tr>
<tr>
<td>CD44 (%)</td>
<td>35.48±18.80</td>
<td>-</td>
</tr>
<tr>
<td>CD24 (%)</td>
<td>46.57±28.03</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: Numerical data are presented in mean and standard deviation while categorical data are presented in percentage.

Expression of Vimentin, E-cadherin, CD44 and CD24

Table 2. Expression of Vimentin in stage IIIB luminal breast cancer tissue

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean (%)</th>
<th>Confidence interval 95%</th>
<th>p-value t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Upper limit (%)</td>
<td>Lower limit (%)</td>
</tr>
<tr>
<td>Response</td>
<td>19</td>
<td>18.68</td>
<td>9.57</td>
<td>27.79</td>
</tr>
<tr>
<td>No response</td>
<td>16</td>
<td>44.81</td>
<td>35.51</td>
<td>54.11</td>
</tr>
</tbody>
</table>

Table 3. Expression of E-cadherin in stage IIIB luminal breast cancer tissue

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean (%)</th>
<th>Confidence interval 95%</th>
<th>p-value t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Upper limit (%)</td>
<td>Lower limit (%)</td>
</tr>
<tr>
<td>Response</td>
<td>19</td>
<td>69.16</td>
<td>48.75</td>
<td>89.57</td>
</tr>
<tr>
<td>No response</td>
<td>16</td>
<td>24.81</td>
<td>14.24</td>
<td>35.38</td>
</tr>
</tbody>
</table>
Table 4. Expression of CD44 in stage IIIB luminal breast cancer tissue

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean (%)</th>
<th>Confidence interval 95%</th>
<th>p-value t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Upper limit (%)</td>
<td>Lower limit(%)</td>
</tr>
<tr>
<td>Response</td>
<td>19</td>
<td>40.47</td>
<td>17.84</td>
<td>63.10</td>
</tr>
<tr>
<td>No response</td>
<td>16</td>
<td>29.56</td>
<td>18.72</td>
<td>40.40</td>
</tr>
</tbody>
</table>

Table 5. Expression of CD24 in stage IIIB luminal breast cancer tissue

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean (%)</th>
<th>Confidence interval 95%</th>
<th>p-value t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Upper limit (%)</td>
<td>Lower limit(%)</td>
</tr>
<tr>
<td>Response</td>
<td>19</td>
<td>52.63</td>
<td>13.65</td>
<td>71.89</td>
</tr>
<tr>
<td>No response</td>
<td>16</td>
<td>51.31</td>
<td>24.20</td>
<td>78.18</td>
</tr>
</tbody>
</table>

The correlation between Vimentin expression and anthracycline-based neoadjuvant chemotherapy response

To see the correlation between Vimentin expression before chemotherapy and neoadjuvant chemotherapy response, the researchers used chi-square test as in Appendix 1.1 with validation of linear by linear association coefficient value of 23.114 and p.value of 0.000.

Table 6. Chi square test results of the correlation between Vimentin, E-cadherin, CD44, CD24 expression and neoadjuvant chemotherapy response in stage IIIB luminal breast cancer patients

<table>
<thead>
<tr>
<th>Chi-square test Linear-by-Linear Association</th>
<th>Nilai</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vimentin</td>
<td>23.114</td>
<td>0.000</td>
</tr>
<tr>
<td>E-cadherin</td>
<td>22.120</td>
<td>0.000</td>
</tr>
<tr>
<td>CD44</td>
<td>99.120</td>
<td>0.002</td>
</tr>
<tr>
<td>CD24</td>
<td>0.023</td>
<td>0.878</td>
</tr>
</tbody>
</table>

Discriminant analysis of the role of Vimentin, E-cadherin, CD44 and CD24 as a predictor of anthracycline-based neoadjuvant chemotherapy response in stage IIIB luminal breast cancer patients.

Discriminant analysis results showed that all discriminant factors (Vimentin, E-cadherin, CD44 and CD24) can be used as a predictor of anthracycline-based chemotherapy response in stage IIIB luminal breast cancer patients with a canonical correlation value of 0.899. Thus, it could be seen that the four variables contributed 80.82% to the determination of neoadjuvant chemotherapy response. Of the four variables measured, i.e. Vimentin, E-cadherin, CD44 and CD24 expression, the predictor strength of each variable on anthracycline-based neoadjuvant chemotherapy response was analyzed. The results showed that Vimentin was the strongest predictor of chemotherapy response with a value of -0.697, successively followed by CD24 (0.529), E-cadherin (0.525) and the weakest CD44 (0.487).

**DISCUSSION**

Potential combination of Vimentin, E-cadherin, CD44 and CD24+ as a predictor model of neoadjuvant...
chemotherapy response in stage IIIB luminal breast cancer patients

The appropriate breast cancer diagnosis approach is very important to develop considering the various factors involved in the success of breast cancer therapy in Dr. Saiful Anwar General Hospital Malang. The standard procedure currently used for the management of breast tumor suspected as locally advanced stage IIIB breast cancer is clinical examination, TNM staging, biopsy for histopathologic examination, and when histopathology examination of breast cancer is positive, it is followed by immunohistochemical examination of ER, PR, HER2 and Ki67 expression before undergoing neoadjuvant chemotherapy. However, this has not provided enough information about the predicted chemotherapy response.

Referring to the biomolecular approach, the mechanisms of breast cancer invasion and migration are based on changes in the morphogenesis of normal epithelial cells due to the decreased E-cadherin, which then forms cell hyperplasia in the form of immature cells (progenitor) which in malignant conditions will change to mesenchymal cells and possess the basic characteristics of progenitor cells that have invasive ability to intrinsically capable of performing malignant transformation independently accompanied by increased Vimentin expression. Several publications mention that the study of Vimentin and E-cadherin expression is inversely proportional to breast cancer progression, including by analyzing resistance conditions to chemotherapy correlated with the involvement of CD44 and CD24 proteins, although the limits mentioned are still limited to increase and decrease in expression and have not mentioned the normal value limits of each parameter. In theory, the increased Vimentin, CD44 and CD24 expression and decreased E-cadherin expression indicate a potentially poor prognosis in cases of breast cancer.

The results demonstrated that all discriminant factors (Vimentin, E-cadherin, CD44 and CD24) show significant variation of function (p.value 0.000) to be used as a predictor of anthracycline-based post-chemotherapy response in stage IIIB luminal breast cancer patients with a canonical correlation value of 0.899. The four independent variables contributed 80.82% to the determination of 3 cycles anthracycline-based neoadjuvant chemotherapy response obtained from the quadratic value of canonical correlation. Vimentin was the strongest predictor of chemotherapy response with a value of -0.697, successively followed by CD24 (0.529), E-cadherin (0.525) and the weakest CD44 (0.487).

Although Vimentin statistically demonstrated as the strongest predictor in determining the response to chemotherapy, but if studied in the participants data distribution, an increase in Vimentin expression above 50% did not necessarily indicate no response to chemotherapy. There were some participants showing Vimentin expression below 50% instead of providing a progressive response. Moreover, E-cadherin expression in some participants showing 100% only indicated partial response, while participants showing lower E-cadherin expression actually indicated complete response. Response variation was also seen in the results of CD44, where partial response and complete response were precisely seen in participants with higher CD44 expression, and this is in contradiction with the previous journal publication which states that CD44 is a transmembrane protein involved in initiation, metastatic and aggressiveness of the tumor. CD24 is a marker protein of slowly dividing cells. This concept is associated with chemotherapy resistance considering the chemotherapy drug effect is more appropriate and will give good results if given in the tumor progression phase or rapidly dividing cells as has been discussed in the previous section. Therefore, the aggressiveness and the slow nature of cell division in cases of breast cancer are almost always associated with CD44 and CD24 expression.

The overall theoretical concepts underlying the activity of each parameter measured in this study would be different when analyzed separately and when studied simultaneously in a reconstruction of a predictor model of anthracycline-based chemotherapy response as in the results of this study. The accuracy score of 97% and the sensitivity of 100% of the four combined variables as a predictor model of chemotherapy response suggest that this model is highly potent for clinical application. The explanation of the reasons for the differences in the activity of the four variables when studied separately based on prior publication with the combination of the four variables in this study is still a Black Box which still requires further studies to see the activities of the four variables when combined biomolecularly. The cross-sectional study approach used by the researchers in this study explains that the four variables are
interrelated to determine the chemotherapy response and shows the difference in activity when compared with the separate analysis of each variable activity. It is scientifically possible that these four predictive proteins when present in the patient’s body cells will work in mutually interrelated and influencing manner, so that the combination of Vimentin, E-cadherin, CD44 and CD24 expression parameters as a whole predictor model is highly likely to be used as one of the guidelines for administration of neoadjuvant chemotherapy in breast cancer.

CONCLUSION

This study shows that there is a correlation between Vimentin, E-cadherin, CD44 and CD24 expression with anthracycline-based neoadjuvant chemotherapy response in stage III luminal breast cancer patients. The overall combination of discriminant factors of Vimentin, E-cadherin, CD44 and CD24 can serve as a predictor of response model to anthracycline-based chemotherapy in stage IIIB luminal breast cancer patients.

Ethical Clearance- Taken from University Brawijaya Ccommittee

Source of Funding- University Brawijaya

Conflict of Interest – None

REFERENCES

Comparison of Tumor Growth in Mice Balb/C Induced Breast Cancer Cells Injected with Corticosteroids and Black Seed Oil Extract

Andi Asadul Islam¹, Itzar Chaidir Islam², Muhammad Faruk¹, Prihantono Prihantono¹

¹Department of Surgery, ²Professional Doctor Program, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia

ABSTRACT

Breast cancer is the main cause of death in malignant disease in women worldwide, including in Indonesia. Treatment of breast cancer has developed the use of herbal seed as a complementary therapy. This study aims to determine the effect of black seed oil on the rate of growth of breast cancer tissue implanted in mice group balb/c subcutaneously. Research carried out by using 24 male experimental animals such as mice balb/c implanted with human breast tumor tissue subcutaneously. Observations were carried out for 30 days by giving black seed oil as much as 0.05 ml/kg/day by subcutaneous injection. The results showed that there was a significant relationship between the provision of black seed oil in reducing the rate of growth of implanted tumors in experimental animals (p <0.001). The results of this study suggest in the use of herbs as an adjunct in the treatment of breast cancer.

Keywords: Breast cancer, mice balb/c, black seed

INTRODUCTION

Breast cancer is a malignant disease that until now still ranks first cause of death in women worldwide.¹ About 140 countries around the world have reported the incidence of breast cancer cases for decades, it is known that there have been at least 1.1 million people worldwide.² In Indonesia, the incidence of breast cancer has been reported to reach 48,998 new cases in 2012 and is expected to continue to grow in line with increasing risk factors that can lead to cancer.³

Currently, treatment of breast cancer has been developed through the method of chemotherapy, radiotherapy, and surgery monotherapy. However, the success of these efforts has not reached the maximum results because there are still many patients who come to the health facility after suffering from advanced cancer.⁴,⁵,⁶,⁷,⁸

In recent decades, herbal therapy has been studied to be used as a complementary therapy that can support the achievement of cancer therapies such as green tea, soy and black seed.⁹,¹⁰,¹¹,¹² Black seed is a plant that contain substances such as quinone, thymoquinone, nigellone, nigellimine, saponin and various other minerals that believed to be an anti-bacterial, anti-pain, anti-inflammatory, anti-oxidant, anti-spasmodic and anti-tumor agent¹³,¹⁴,¹⁵

Therefore, this study aimed to determine the effect of black oil seed to the growing rate of breast cancer tissue implanted in mice group balb / c subcutaneously. The results of this study will be able to be a recommendation in the use of herbs as an adjunct in the treatment of breast cancer.

MATERIALS AND METHOD

This study was conducted using 24 mice species balb/c as a subject. Criteria for inclusion in this study were mice 2-3 weeks of age, a female, and weights 50-100 grams. Meanwhile, the exclusion criteria that mice who have a physical disability and death when treated mice. The whole animal in this study is maintained in the treatment chamber at 25°C with a given standard feed and drink in moderation.¹⁶ The subject of experimental animals that have met the study criteria were divided into 3 groups of observations, group A by injection of black seed oil 0.05 ml/kg/day¹⁷, group B were given a
corticosteroid injection of 0.1 ml/kg/day and group C by injection of 0.9% NaCl 0.5 ml/day.

**General procedure**

Breast cancer networks have been obtained, stored in a refrigerator temperature of -20°C to prevent necrosis and apoptosis. The tissue sample to be implanted, cut by square shape with a size of 0.5 x 0.5 cm were 24 sections according to the number of experimental animals. Planting of breast cancer tissue is done by slicing the skin of mice on the lower back area approximately 2-3 cm from the base of the tail. Performed using a scalpel incision size 18 to follow the direction of the line leather tendrils. Samples of tumor tissue that has been cut and then inserted under the skin and stapled tissue between the layers of skin and muscle of mice without stitches. Once restrained, mouse skin stitched with thread chrome then carried out disinfection.

**Black seed oil and drug injection**

Injection treatment done by inserting the liquid into 1 ml syringe then injected at the wound edge of the planted area.

**Diagnostic Method**

Histopathological examination of tissue carried out using paraffinization techniques. Tissue that have been treated for four weeks lifted using a scalpel and then soaked in a 10% formalin solution for fixation and mobilized to the laboratory. After soaking, the tissue cut and put in a cassette embedding for further process of dehydration and clearing. Once the tissue became clear, a process paraffin infiltration, cutting and staining of tissue blocks to facilitate observation. Interpretation and evaluation of research results, interpretation macroscopic conducted to monitor the physical condition of the experimental animals.

**RESULTS AND DISCUSSION**

In this study, 8 of 24 animals were excluded from the study because of illness or died in their treatment process. It is mainly influenced by the injury as a result of injection in the treatment process. Most of animals are experiencing psychological stress when exposed to trauma.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Papules</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>% sample</td>
<td>50.0%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>% sample</td>
<td>50.0%</td>
</tr>
<tr>
<td>Pustule (inflammation)</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>% sample</td>
<td>16.6%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>% sample</td>
<td>37.5%</td>
</tr>
<tr>
<td>Erosion</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>% sample</td>
<td>16.6%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>% sample</td>
<td>83.4%</td>
</tr>
<tr>
<td>Crusting</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>% sample</td>
<td>33.3%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>% sample</td>
<td>66.7%</td>
</tr>
<tr>
<td>Scar</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>% sample</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>% sample of</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Table 1 shows the results of observation of skin changes in experimental animals after treatment. Based on the results of statistical analysis using the test, Fischer exact p-value obtained for 0.361, indicated that no significant relationship between each treatment solution to changes in the structure of skin in mice.

In this study, wounds created in mice is shaped as a transverse incision with size of 2 cm on the upper back. After the treatment, samples A1, A2, A5, C1, C2, C3 and C6 show changes in skin structure in the form of circular stitching wounds covered golden brown crust with basic erythema, demarcated and regular edges, a diameter
of 0.21 - 0.3 cm. There are also a sign of inflammation in the form of spots of pus in the top of the lesion for sample A1, C1, C3 and C6 and minimal erosion tissue insample C1. For A3, A4, A6, B1, B2, C1, C2, C4, and C5 samples, it appears to change the skin structure of the emergence of a network sicatrix induration circle with a diameter of 0.1 cm, no evidence of any infection and signs of other abnormalities. For samples B3 and B4 found no sign of any defect in the sample.

In this study, the extract of black seed oil was observed giving a faster effect in wound healing incision and stitches after tissue implantation. This was proved by adhesion stitches on day 3 and heal wounds without scars on the fifth day. Also, the provision of black seed oil is also known to affect minimizing the inflammatory process in experimental animals wounds. This is shown by the amount of animal suffering pustule lesions when compared with the other treatment groups.

Black seed seed oil has been known to contain substances thymoquinone and essential oils. Giving black seed oil gives a good effect in wound healing through mechanisms of the accelerated proliferation of connective tissue as well as an increase in the rate of granulation epidermal cells that trigger the maturation and growth of the epidermis.\textsuperscript{23,24}

**The growth of the network insulate**

In this study, conducted human mammary tumor tissue implantation with a size of 0.5 x 0.5 cm on each animal. After the implantation process carried out observations of changes in network size implant for 30 days of maintenance. Results obtained are as follows:

<table>
<thead>
<tr>
<th>Code sample</th>
<th>Mean (cm)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>0.08 cm</td>
<td>0.60</td>
</tr>
<tr>
<td>A2</td>
<td>0.25 cm</td>
<td>0.15</td>
</tr>
<tr>
<td>A3</td>
<td>0.25 cm</td>
<td>0.25</td>
</tr>
<tr>
<td>A4</td>
<td>0.25 cm</td>
<td>0.24</td>
</tr>
<tr>
<td>A5</td>
<td>0.25 cm</td>
<td>0.38</td>
</tr>
<tr>
<td>A6</td>
<td>0.25 cm</td>
<td>0.37</td>
</tr>
<tr>
<td>B1</td>
<td>0.25 cm</td>
<td>0.30</td>
</tr>
<tr>
<td>B2</td>
<td>0.25 cm</td>
<td>0.56</td>
</tr>
<tr>
<td>B3</td>
<td>0.25 cm</td>
<td>0.30</td>
</tr>
<tr>
<td>B4</td>
<td>0.25 cm</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>C1</td>
<td>0.39 cm</td>
<td>0.70</td>
</tr>
<tr>
<td>C2</td>
<td>0.25 cm</td>
<td>1.40</td>
</tr>
<tr>
<td>C3</td>
<td>0.25 cm</td>
<td>0.56</td>
</tr>
<tr>
<td>C4</td>
<td>0.25 cm</td>
<td>0.37</td>
</tr>
<tr>
<td>C5</td>
<td>0.25 cm</td>
<td>0.36</td>
</tr>
<tr>
<td>C6</td>
<td>0.25 cm</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Table 2 above shows the measurement results induration network based on measurements using a ruler and calipers. Based on the table, it can be seen that the average value growth of tissue implanted in mice is 0.08 cm for Group A, 0.14 cm for group B and group C. 0.39 cm for statistical analysis using t-test independent test showed \( p\)-value of <0.001, which means that there is a significant relationship between the provision of black seed oil in reducing the rate of growth of implanted tumors in experimental animals.
Based on the table, it can be concluded that the extract of black seed oil has the greatest effect in inhibiting the growth of tumor tissue implanted. This could be related to the content thymoquinone (Tq), which is the main constituent of the oil extract of Nigella sativa. This substance induces apoptosis and inhibits cell proliferation PDA.\textsuperscript{25,26} Thymoquinone also proved to lower-downstream nucleic acid translocation and DNA binding of nuclear factor-kappa-B (NF-κB) through blockade of phosphorylation and degradation IκBα in mice.\textsuperscript{27}

The provision of corticosteroids in this study does not provide a great effect in suppressing the development of tumors implanted tissue. It can be affected because these drugs have more specific effects on lymphocyte tissue and organ malignancy resulting in lymphocytic.\textsuperscript{28} The mechanism of action initially considered to be caused by the disruption of energy use through reductions in glucose transport and/or phosphorylation; later found that glucocorticoids induce apoptosis, or programmed cell death, in particular, lymphoid cell populations.\textsuperscript{29,30} Therefore, the use of corticosteroids in this study showed a smaller effect than other groups.

c. Histopathological examination

Description: The

- black arrow: tumor tissue accompanied by inflammatory cell infiltration are at least

Description: The

- black arrow: tumor tissue with granulation inflammatory cells
- blue arrow: fat tissue
- green arrow: vascular

Description: The

- black arrow: tumor tissue surrounded by fat
- yellow arrow: tissue: tissue abscess

Figure 1. Microscopic examination of the tissue
Based on histopathologic examination performed, it can be seen that there is a growing activity of tumor tissue implanted by the presence of vascular branching found in every tissue specimens. On examination of the breast tissue, generally will find an overview of tissue structure such as ducts and lobules of the breast, fat tissue, interstitial connective tissue, pieces of nerves, lymph and blood vessels. It used as an indicator in the diagnosis of breast cancer stage.31,32

In this study, three treatment groups did not show a huge difference regarding both changes in the skin’s epidermis, adnexal and subcutaneous tissue. In this study, tissue samples were examined three groups describe skin tissue that is not intact, while the glands and hair follicles are difficult to identify. It can be influenced by the methods and means of processing the samples were carried out.33 However, group A is the most minimal inflammatory cell infiltrate group. This is proven by the discovery of inflammatory buildup cells in the subcutaneous tissue samples of group B and the discovery of tissue abscesses in group C.

**CONCLUSION**

Based on the results obtained, it can be concluded that:

Implantation of human breast tissue in mice can be developed due to the growing evidence of vascularization in histopathology.

Injection of black seed oil in mice implanted breast tumor tissue may give effect to the suppression of inflammatory processes and inhibition of tissue growth.

**Ethical Clearance** - Taken from Hasanuddin University

**Source of Funding** - Self Funding

**Conflict of Interest** – None

**REFERENCES**

15. Kooti W, Hasanzadeh-Noohi Z, Sharafi-


Hemorrhoidectomy using Hemorrhoidal Artery Ligation and Rectoanal Repair (HAL-RAR) Technique to Reduce Level of Pain Perceived by Patients Postoperative

Warsinggih¹, Prihantono¹

¹Senior Lecturer of Department of Surgery, Faculty of Medicine, University of Hasanuddin, Makassar, Indonesia

ABSTRACT

Background: Research purposes: This study aims to determine the relationship of pain levels in patients using the Numeric rating scale in patients hemorrhoid operation with Hemorrhoidal Artery Ligation and Rectoanal Repair (HAL-RAR) method in Siloam Hospital Makassar.

Research methods: This study was an observational study with the cross-sectional analytic study. Total samples of this study were 56 hemorrhoid patients operated using HAL-RAR method. Data collected including age, gender, hemorrhoidal grading, the number of actions HAL-RAR and levels of pain perceived by the patient. Analysis of data using ANOVA and t-test.

Research result: The results showed 31 patients (55.4%) were in the age category 18-40 years. 30 patients (53.6%) were in grade III hemorrhoids. The number of actions in the HAL-RAR method most 4 actions with presentations HAL-RAR 66.1% and 60.7%. There are significant research results shows HAL-RAR operation techniques for the gender of ≥3 days postoperatively with a value of \( p = 0.046 \), correlation with age morbidity in patients with hemorrhoidal surgery during the operation with a value of \( p = 0.031 \) and there is a relationship grading hemorrhoids with pain patients \( p = 0.000 \)

Conclusion: Hemorrhoidal surgery techniques with the HAL-RAR method prove in reducing the level of pain experienced by the patient.

Keywords: hemorrhoids, HAL-RAR, numeric rating scale

INTRODUCTION

A hemorrhoid is a collection of widening one or more segments of hemorrhoidal veins in the anorectal area. The hemorrhoid is not just a hemorrhoidal venous dilation, but are more complex that involves several elements such as blood vessels, soft tissue, and muscle around the anorectal¹. The hemorrhoid is a dilation of the veins in the tunica mucosa and tunica submucosa of the hemorrhoidal plexus internal and external hemorrhoids plexus³.

Based on the results of previous studies, about 75% of people in the population will suffer from hemorrhoids in his life³. National Center for Health Statistics (NCHS), reported that there are ten million people in the United States complain of hemorrhoids. The prevalence of hemorrhoids are reported in the United States is 4.4% with a peak incidence between the ages of 45-65 years. Meanwhile, at the age of 20 years under Hemorrhoid disease is rare. Prevalamsi the Caucasian race and individuals with high economic status⁴,⁶.

There are several techniques in surgery for the treatment of hemorrhoids, one of which is with HAL-RAR techniques. It is Hemorrhoid Artery Ligation or Hemorrhoid artery binding, and Recto Anal Repair RAR is by repairing the anus and rectum colon alias estuary. This method was first applied by the Japanese surgeon,
Kazumassa Morinaga in 1995, using doppler anoscopy detect blood vessels to supply hemorrhoids and perform ligation blood vessels, the next added further action that restores the mucous hemorrhoids are down, by way of repair is done by sewing and tying upward hemorrhoids mucosa called RAR method

Advantages of hemorrhoid therapy using HAL-RAR method is effective, safe and convenient. In a multi-cancer research consists of a total of 184 cases of hemorrhoids high degree in 7 countries, 89% of patients free of symptoms of hemorrhoids after the 12 months. Ligation using the HAL-RAR is very safe so minimal complications during and after the act of therapeutic action. Ligation using HAL-RAR performed without cutting, or removal of tissue and leaves no open wound so that the pain is felt minimal (1-3 degrees), the time of action is concise, which is 60-180 minutes, depending on the severity of hemorrhoids

Based on this background, researchers wanted to examine the relationship of pain level at HAL-RAR surgery in patients with hemorrhoids at Siloam Hospital.

**MATERIALS AND METHOD**

This research was conducted in doing Siloam Hospital Makassar in patients with a diagnosis of hemorrhoids and carried out the operation with HAL-RAR technique from January 2015 to November 2016. This type of research is observational analytic with the cross sectional study. The population of this study were all patients with a diagnosis of hemorrhoids given action with HAL-RAR surgery techniques amounted to 56 patients., Sampling is done by total sampling with 56 respondents.

Data collected in the study are primary data. Data obtained from measurements Numeric Rating Scale to get the level of pain experienced by patients with hemorrhoids with HAL-RAR operation techniques. Analysis of data such as ANOVA test to test age and grading hemorrhoids on the level of pain and the t-test was used to test the gender of the patient in pain operation with HAL-RAR techniques Siloam Hospital Makassar.

**RESULTS AND DISCUSSION**

**Characteristics of Respondents**

Table 1 shows that the participants at the broadest age range are 18-40 years with some 31 respondents or 55.4%. While the smallest amount is in the range of ≥61 years of age as much as three respondents or 5.4 of the total number of respondents to the study.

Diagnosis Related severity of hemorrhoids there were 30 respondents to the grading hemorrhoids category III or at most a small number of diagnoses 53.6 and is a grade II hemorrhoids with as many as eight respondents or by 14.3% of the total response this study.

**Table 1. Characteristics of Respondents**

<table>
<thead>
<tr>
<th>Characteristics of Respondents</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-40</td>
<td>31</td>
<td>55.4</td>
</tr>
<tr>
<td>41-60</td>
<td>22</td>
<td>39.3</td>
</tr>
<tr>
<td>≥61</td>
<td>3</td>
<td>5.4</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man</td>
<td>30</td>
<td>53.6</td>
</tr>
<tr>
<td>woman</td>
<td>26</td>
<td>46.4</td>
</tr>
<tr>
<td>grade Hemorrhoids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>8</td>
<td>14.3</td>
</tr>
<tr>
<td>III</td>
<td>30</td>
<td>53.6</td>
</tr>
<tr>
<td>IV</td>
<td>18</td>
<td>32.1</td>
</tr>
<tr>
<td>Pain level Operation Day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>8</td>
<td>14.3</td>
</tr>
<tr>
<td>moderate</td>
<td>23</td>
<td>41.1</td>
</tr>
<tr>
<td>It hurts</td>
<td>25</td>
<td>44.6</td>
</tr>
<tr>
<td>One day postoperative morbidity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>35</td>
<td>62.5</td>
</tr>
<tr>
<td>moderate</td>
<td>20</td>
<td>35.7</td>
</tr>
<tr>
<td>It hurts</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>2-day postoperative morbidity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>52</td>
<td>92.9</td>
</tr>
<tr>
<td>moderate</td>
<td>4</td>
<td>7.1</td>
</tr>
<tr>
<td>It hurts</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Postoperative morbidity ≥3 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>55</td>
<td>98.2</td>
</tr>
<tr>
<td>moderate</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>It hurts</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>56</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 1 shows the data that most respondents as many as 25 respondents (44.6%) had pain category once on the day of surgery. After one day postoperatively 35 respondents (62.5%) had mild pain category. On the second postoperative day, 52 respondents are in the category of mild pain or by 92.9%. Later to 3 or more
after surgery is one respondents who experienced moderate pain or 1.8% of total survey respondents who are 56.

**Relationships Sex With Pain Level**

PNo ≥3 days postoperatively with a value of p = 0.046. At the time of the operation, there was no correlation between gender and the amount of pain experienced by patients with p = 0.167. Furthermore, on the first day postoperative p-value = 0.343 which means there is no significant relationship between gender morbidity.

**Relationship Age Level Of Pain Patients**

Table 2 shows that there is a relationship between age and the level of pain on the day of surgery with a value of p = 0.031. The next on the first day until ≥3 days postoperatively no significant relationship between age and the level of pain with each value of p is the first-day postoperative p = 0.125, the second-day postoperative p = 0.686 and ≥3 days postoperatively p = 0.686.

**Table 2. Relations with the level of pain the patient’s age**

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>nrs0</td>
<td></td>
<td>2</td>
<td>13.898</td>
<td>3.726</td>
<td>0.031</td>
</tr>
<tr>
<td>Between Groups</td>
<td>27.797</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>123.730</td>
<td>52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>221.527</td>
<td>54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nrs1</td>
<td></td>
<td>2</td>
<td>6.426</td>
<td>2.063</td>
<td>0.125</td>
</tr>
<tr>
<td>Between Groups</td>
<td>12.862</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>154.658</td>
<td>52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>166.520</td>
<td>54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nrs2</td>
<td></td>
<td>2</td>
<td>5.59</td>
<td>1.473</td>
<td>0.586</td>
</tr>
<tr>
<td>Between Groups</td>
<td>1.118</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>76.591</td>
<td>52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>77.709</td>
<td>54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nrs3</td>
<td></td>
<td>2</td>
<td>1.097</td>
<td>1.042</td>
<td>0.380</td>
</tr>
<tr>
<td>Between Groups</td>
<td>2.194</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>53.676</td>
<td>51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>55.870</td>
<td>53</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant relationship at the age of painfully day of operation it shows that the HAL-RAR action in patients with hemorrhoids during surgery reduces pain in patients with hemorrhoids significantly.

**Grade relationship Hemorrhoid Level Of Pain Patients**

Table 3: Shows that there is a significant relationship between the level of pain in patients with hemorrhoidal grading. On the first day until the second day found a significant relationship with the respective p values were as follows; Operating days p = 0.000, the first-day postoperative p = 0.000, the second-day postoperative p = 0.007, ≥3 days postoperatively p = 0.003.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>nrs0</td>
<td></td>
<td>2</td>
<td>63.044</td>
<td>30.964</td>
<td>0.002</td>
</tr>
<tr>
<td>Between Groups</td>
<td>125.059</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>107.911</td>
<td>53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>234.920</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nrs1</td>
<td></td>
<td>2</td>
<td>31.398</td>
<td>15.244</td>
<td>0.003</td>
</tr>
<tr>
<td>Between Groups</td>
<td>62.730</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>109.916</td>
<td>53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>171.846</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nrs2</td>
<td></td>
<td>2</td>
<td>6.844</td>
<td>5.471</td>
<td>0.007</td>
</tr>
<tr>
<td>Between Groups</td>
<td>13.689</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>66.311</td>
<td>53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80.000</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nrs3</td>
<td></td>
<td>2</td>
<td>5.659</td>
<td>6.522</td>
<td>0.003</td>
</tr>
<tr>
<td>Between Groups</td>
<td>11.319</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>45.510</td>
<td>52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>56.829</td>
<td>54</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A total of 56 respondents hemorrhoids patients given action with HAL-RAR operation techniques contained 25 respondents had complaints of pain but on the first day postoperatively reduced to one respondent, and on the second day postoperative patients with complaints of pain do not exist. This is according to research conducted by Eugeny (2008) that the surgical technique HAL-RAR caused a lack of pain experienced by patients postoperatively in Moscow, Russia. Roka S. et al. (2012) also states that the surgical technique is the safe and effective method of RAR.

CONCLUSIONS AND RECOMMENDATIONS

Based on a study of 56 hemorrhoidal patients in Siloam Hospital Makassar then the conclusion is as follows: there was a relationship of sex with pain patients ≥3 days after surgery, there is relationship morbidity with age, and there is a relationship with the respondent’s age grade hemorrhoids research.

Suggested for further research to examine differences in pain levels with different operating methods in patient hemorrhoid

CONFLICT OF INTEREST: Authors declare that there is no conflict of interest within this research and publication paper

Ethical Clearence: Research has obtained approval from Hasanuddin University

Financial Source: Self Funding

REFERENCES

Characteristics of Multi-drug Resistant Tuberculosis (MDR-TB) Patients in Medan City in 2015-2016

Syarifah¹, Erna Mutiara², Sri Novita³

¹Senior Lecturer, Department of Health Promotion and Behavioral Science, Faculty of Public Health Universitas Sumatera Utara, ²Department of Population and Biostatistics, Faculty of Public Health Universitas Sumatera Utara, ³Department of Epidemiology, Faculty of Public Health Universitas Sumatera Utara

ABSTRACT

Nowadays, Multi-drug Resistant Tuberculosis (MDR-TB) is increasing both at the global level and Indonesia. Indonesia is ranked the eighth of MDR-TB cases in the world, Medan City is the highest of MDR-TB patients region in North Sumatra. This study aimed to understand the characteristics of MDR-TB patients based on age, sex and residence in Medan City.

The study is a descriptive study using secondary data through the data of E-TB manager, and mapping the patient’s residence. The population in this study were all MDR-TB patients in Medan City in 2015-2016 recorded in E-TB Manager as many as 133. Samples were all MDR-TB patients who underwent treatment in 2015-2016 in Medan City. Characteristic data collection based on age, sex and residence was collected through secondary data obtained from E-TB Manager data. Characteristics based on where they lived conducted by mapping with GPS on 21 subdistricts in Medan City. Data were analyzed descriptively.

The result of research that age patients generally productive category and the most aged 45-54 years as many as 30,90%, second largest aged 35-44 years counted of 19,90%. The sex of most patients were male 65,4%. Male were more disobedient to treatment (80%). Age group at most treatment defaulter was group of 45-54 years (33,4%), and the most default of treatment was in the initial phase namely the first 6 months (80%).

Based on the result of mapping of respondent’s residence that could be mapped only (78,95%), this was because among other things incomplete address, address which was listed at the time of treatment at Adam Malik Hospital not according to identity card (KTP), temporary address because they lived in their children’s or relatives’ houses, moved without notifying at the nearest health service. It is suggested generally to the people to prevent transmission of MDR-TB, by taking treatment sensitive TB (category 1) diligently so it is not going to get worse MDR-TB. If they already have MDR-TB they have to be persistent in taking treatment for longer treatment periods, severer of side effects with greater costs, but up to now free MDR-TB financing at the hospital which has determined and for the poor people were also provided with transport funds with certain conditions. To MDR-TB patients it was sugested to provide complete address data and notify if they moved in order to facilitate monitoring them.

Keywords: characteristics, multi-drug resistant tuberculosis, MDR-TB, patients, mapping

INTRODUCTION

Currently, Multi-drug Resistant Tuberculosis (MDR-TB) is increasing both at the global level and Indonesia. Indonesia is ranked the eight most MDR-TB cases in the world. In 2016 out of 13906 suspect MDR-
TB only 1589 who started treatment and 2144 were MDR/Resistant to Rifampicin-TB

Adam Malik Hospital which is one of the referrals of MDR-TB cases in Sumatra, has started treatment of MDR-TB cases since 2012. In 2015 suspect MDR-TB at Adam Malik Hospital were 738 cases, in 2016 increased to 1719 cases. Of the cases confirmed in 2015 only 131 cases subsequently started treatment only 123 cases (18%). In 2016 cases confirmed decreased i.e 185 cases (11%) and who started treatment as many as 177 cases.

From MDR-TB cases data at Adam Malik Hospital it was known that Medan City is the biggest cases contributor of 154 patients undergoing treatment (2016). Default rate since from 2012 were high enough that out of 13 patients underwent treatment there were 5 patients (38.5 %) were treatment defaulters, in 2013 of 62 patients underwent treatment 10 patients among them (16.1%) were treatment defaulters. In 2014 there were 125 patients underwent treatment, 12 people were treatment defaulters (9.6%). The default rate was still higher than the tolerable rate (5%).

As it was known that MDR-TB cases required long-term treatment, costly, drug side effects ranging from low to high levels. For that much it was needed perseverance treatment from patients. The results of qualitative research conducted by Mutiara and Syarifah about the Development of Compliance Model of Multi-drug Resistant Patients in the Therapeutic Program in Medan City in 2015, indicated that the supporting factors that influenced the patients adhered treatment included patients’ knowledge, officers’ attitude, the desire or intention to be health. In addition family, neighboring’s support, community leaders, support of health personels, workplace support and good communication. The inhibiting factors that affect patients’ treatment were side effects, other diseases, poor physical condition, disease severity, non-health personels of TB treatment observers, health facilities and economic.

The results of qualitative research about The Description of Treatment Risk Factors of MDR-TB Patients at Labuang Baji Hospital Makassar City in 2013 showed that the risk factors that patients most complained were side effects, saturated in medication, and cost during treatment. Improvements should be made to the quality of TB and MDR-TB patients services in order to prevent the possibility of patients not completing treatment.

While research on Risk Factors of Multi-drug Resistant Tuberculosis showed that the risk factors that have been shown to affect the incidence of Multi-drug Resistant Tuberculosis were the low motivation of the patients and irregular treatment. It was required variety of supports, especially from the patients’ family and environment in order to motivate MDR-TB patients that the disease could be cured and took treatment regularly.

Similarly, studies on the identification of Multi-drug Resistant Tuberculosis (MDR-TB) risk factors showed that most patients did not take anti tuberculosis drugs (OAT) according to the correct guidance, as a risk factor from the drug. Low visits to primary health care for TB treatment as a risk factor from health program and system.

Further research conducted at Dr. Moewardi hospital, with the number of patients confirmed MDR-TB as many as 114 patients: 56 males and 58 females. The most side effect to gastrointestinal disorders: nausea 79.8%, vomiting 78.9%. Mostly side effects were mild 76.3%. There is an association between a history of TB treatment and renal disorders, between sex and renal impairment and hearing loss.

Due to the low number of patients starting treatment, the high number of default rates, it is necessary to conduct research to understand the characteristics of MDR-TB patients by age, sex and residence. Characteristics of age and sex were analyzed through E-TB Manager, whereas the characteristic of residence location was mapping with GPS. The importance of residence location mapping is to facilitate monitoring so there are no patients lost to follow from treatment, since initial treatment from Adam Malik Hospital until they are returned to the nearest health service to their residence. The problems are MDR-TB cases are increasing, the cases that start treatment are low, the default rate is high. This study describe characteristics of MDR-TB patients by age, sex and residence location.

**MATERIALS AND METHOD**

This research was descriptive study using secondary data through E-TB manager data, and mapping of patients’ residence location using GPS. The study was conducted in Medan City because the most MDR-TB cases were in
North Sumatera. The population in this study were all MDR-TB patients in Medan City in 2015-2016 recorded in E-TB Manager a total of 133. The samples were all MDR-TB patients underwent treatment in 2015-2016 in Medan City. Characteristic data collection based on age and sex were collected through secondary data obtained from E-TB Manager data. Characteristics based on where their live, it was conducted mapping with GPS on 21 Subdistricts in Medan City. Data were analyzed descriptively.

RESULT AND DISCUSSION

Characteristics of Patients by Age

It was known that TB cases did not consider at age, sex and social status. The results showed 133 cases of MDR-TB in Medan City, most of them were in the productive age category, although the most were 45-54 years old (30.90%), the second order were aged 35-44 years as much (19.90%). This data were similar to the previous research revealing that MDR-TB patients originated from the productive age group7,8.

This condition will have an impact on work productivity, ultimately of course impact on the economy. Economically it is estimated that if an adult TB patient, it will lose the average working time of 3 to 4 months. This condition resulted in the loss of household annual income about 20 - 30%. If he died due to TB, he would lose income about 15 years 9. Thus, TB is not only an individual problem at all, but it can also affect the family as well as the incidence of poverty due to unemployment. Completely it can be seen in the following diagram:

Source : data E-TB Manager 2015-2016

Figure 1. Percentage of MDR-TB Patients by Age Group in Medan City in 2015-2016

Characteristics Patients by Sex

The results showed that MDR-TB cases were mostly suffered by male compared to female. This research was not much different from previous research10. The high rates of MDR-TB in male can be explained that it was assumed to be related to epidemiological differences, exposure to the risk of infection due to lifestyle such as smoking, occupations exposed to indoor and outdoor pollutants and disease progression.

In addition, the above phenomena were thought to be related to socio-cultural aspects, including health seeking behavior, access to health services and stigma that still distinguish between the both of sexes, in which men in patrilineal society were more preferred11,12. The comparison of TB incidents by sex according to WHO is important to assess whether the diagnosis, reporting and treatment of TB in certain sex is better than the other sex. The MDR-TB patients description by sex can be seen in the following diagram:

Source : data from E-TB Manager 2015/2016

Figure 2. Percentage of MDR-TB Patients by Sex in Medan City in 2015-2016

Characteristics Patients by Medicine Compliance

If the characteristics of respondents were based on the level of compliance then the male were mostly not comply (default) (80%). While the age group with the most default from treatment was a group of 45-54 years as much (33.4%). Generally, most default from treatment was in the early phase i.e the first 6 months (80%).
Table 1. The Characteristic of MDR-TB Patients Who Comply, Default from Treatment and Died in Medan City in 2015-2016

<table>
<thead>
<tr>
<th></th>
<th>Comply Patients</th>
<th>Defaulter Patients</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total 2015</td>
<td>2016</td>
<td>Total %</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56</td>
<td>2</td>
<td>10</td>
<td>12  80</td>
</tr>
<tr>
<td>Female</td>
<td>32</td>
<td>0</td>
<td>3</td>
<td>3   20</td>
</tr>
<tr>
<td>Age Group (Year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>11</td>
<td>1</td>
<td>1</td>
<td>2   13,3</td>
</tr>
<tr>
<td>25-34</td>
<td>11</td>
<td>0</td>
<td>2</td>
<td>2   13,3</td>
</tr>
<tr>
<td>35-44</td>
<td>19</td>
<td>1</td>
<td>2</td>
<td>3   20</td>
</tr>
<tr>
<td>45-54</td>
<td>29</td>
<td>0</td>
<td>5</td>
<td>5   33,4</td>
</tr>
<tr>
<td>55-64</td>
<td>16</td>
<td>0</td>
<td>3</td>
<td>3   20</td>
</tr>
<tr>
<td>&gt;65</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Treatment Length of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Before Default</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>from Treatment (Months)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-6</td>
<td>2</td>
<td>10</td>
<td>12</td>
<td>80</td>
</tr>
<tr>
<td>7-12</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>13,3</td>
</tr>
<tr>
<td>13-24</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>6,7</td>
</tr>
<tr>
<td>&gt;24</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Died</td>
<td>8</td>
<td>7</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Source: data from E-TB Manager 2015/2016

Characteristic of MDR-TB Patients by Location in Medan City

Location is one of the important things in epidemiological studies, for that reason it was done the mapping of MDR-TB patients in Medan City. Data of MDR-TB from 2015 - 2016 in Medan City were 133 cases. Of these number, only 105 (78.95%) were able to be traced and mapped, due to incomplete addresses, the address listed at the Adam Malik Hospital did not match with the identity card (KTP), the temporary address because they lived in their children’s/relative’s house, moved to residence without notifying the nearest health service. This condition certainly resulted how difficult to reach the patients especially patients with long therapy. The mapping result showed that the most cases found and mapped are in subdistricts of Medan Belawan, Medan Labuhan and Medan Tuntungan. Medan Belawan and Medan Labuhan are coastal areas where the population mostly have occupations as fishermen, besides these areas are dense and poor. There are 60,024 people in subdistricts are in poor category, the highest is in Medan City, second order is in Medan Labuhan with total poor population 50,051. While Medan Tuntungan is more characterized as the sub-urban community to the mountain area. The results of mapping that has been implemented can be seen in the following figure:
Conclusion and Suggestion

CONCLUSION

The result of research that age patients generally productive category and the most aged 45-54 years as many as 30.90%, second largest aged 35-44 years counted of 19.90%. The sex of most patients were male 65.4%. Male were more disobedient to treatment (80%). Age group at most treatment defaulter was group of 45-54 years (33.4%), and the most default of treatment was in the initial phase namely the first 6 months (80%).

Based on the result of mapping of respondent’s residence that could be mapped only (78.95%), this was because among other things incomplete address, address which was listed at the time of treatment at Adam Malik Hospital not according to identity card (KTP), temporary address because they lived in their children’s or relatives’ houses, moved without notifying at the nearest health service.

Suggestion

It is suggested generally to the people to prevent transmission of MDR-TB, by taking treatment sensitive TB (category 1) diligently so it is not going to get worse MDR-TB. If they already have MDR-TB they have to be persistent in taking treatment for longer treatment periods, severer of side effects with greater costs, but up to now free MDR-TB financing at the hospital which has determined and for the poor people were also provided with transport funds with certain conditions.

To MDR-TB patients it is sugested to provide complete address data and notify if they moved in order to facilitate monitoring them.

Conflict of Interest: Authors declare that there is no conflict of interest within this research and publication paper

Ethical Clearance: Research has obtained approval from Universitas Sumatera Utara

Financial Source: This research and publication were supported by Universitas Sumatera Utara

REFERENCES

1. Ministry of Health RI. Directorate General of Disease Control and Environmental Health, DG of Disease Control and Environmental Health, Ministry of Health (Kemenkes RI). National


An Investigation in Learning English Language by Students of Sudanese University A Case Study of Tertiary Level Khartoum Locality

Sangita Babu¹, Mahassin Osman Mohmmed Gibreel²

¹Assistant Professor Department of Computer Science, King Khalid University Kingdom of Saudi Arabia, ²Assistant Professor, Department of English, King Khalid University, Kingdom of Saudi Arabia

ABSTRACT

The study has been made to investigate the students’ of Sudanese university in learning English language in Khartoum Locality. The researcher uses the descriptive analytical approach, which depends upon analyzing and justifying the data. This approach suits this study, which aims at investigating the obstacles facing Sudanese students in learning English language from students’ point of view, which, led to answer the questions of the study. A questionnaire and interview card were designed and administered to a sample of students, which represents approximately 12% of the population of the study from different universities to collect data, which was treated statistically using the SPSS program (Statistical Package for the Social Sciences).

Based on the investigations, it found that it is important to give more attention in teaching Language at universities. This will produce students with good command of English; The efforts can be made to conduct training programs for teachers, workshops and increasing the number of periods for English per a week to help students in this regard. It is also found that classes need to be more student-student-student centered than teacher-centered and encourage interaction in order to facilitate communication amongst students in classes and variety of teaching methods, physical facilities, technology and materials, and university resources have much better impact on students. The Sudan universities also need to pay more attention in the design of curriculum to enhance learning English Language.

Keywords: Low achievement, teaching methods, physical facilities, technology and materials.

INTRODUCTION

English has increasingly become the international language for business commerce, science, technology, international relations and diplomacy. Language always develops and changes as changes in social and cultures, the language development most frequently in the field of science and technology.

English is an international language, which used for communication with foreigners at home and abroad. It is the language of science; therefore, all university students, regardless of their specialization, will need to follow up their studies and to look for information and acquire knowledge, hence most of the universities worldwide include English as one of their requirements.

A number of studies have been carried out in different countries to investigate issues related to teaching English as a second or a foreign language. For example, an investigation has been carried on Hadhramout Petroleum Engineering Student’s motivation and attitudes towards learning English language. Also, it has been tried to examine the factors responsible for the poor quality of teaching English as a second language in Nigeria. The study revealed that English language teachers neither frequently use modern instructional techniques nor vary their teaching methods. In addition, an investigation of non-English major undergraduates’ views on how they prefer learning English in their general English English language programs in Jordan Abdul-Fattah. Also, the assess of the input variables of university English language programs in Jordan Abdul-Fattah. Moreover, the investigation of students’ beliefs about
language learning and teaching in the English language methods courses at Alexandria [8-9].

This study tried to investigate the reasons behind Sudan non-English university students’ low achievement in English Language from students’ points of view [10].

LITERATURE REVIEW

[7] Investigating Learning English Strategies and English Needs of Undergraduate Students at the National University of Laos. definite that language learning strategies are the specific manners or thoughts students use to increase their language learning. The aim is to determine the problems and the practice of learning and teaching English as a foreign language in the Faculty of Education, the National University of Laos. However, the main objective of this study seeks to identify the factors that cause low English language proficiency among student-teachers who have registered in Continuing Summer Program for Bachelor of Teacher Education in English. “Why Lao students weak in English?,” was employed as a tool in this study in order to ask the English student-teachers’ perceptions towards reasons that Lao students are poor performance for learning English as a foreign language.

[11-12] an experiment and taught about a multilingual class of about 34 people. The students were sorted into (L1) groups so that they can help each other. The students who came from countries where they were the only ones of that nationality in the class dropped out quite quickly. The ones with the L1 support groups stayed till the end of the course.

[13] [14] It has been found out that the native language has a facilitating role and is necessary to motivate young children. They said that the use of mother tongue is justified as soon as it is beneficial for students. They also added that using L1 as long as it is justified has a motivating effect especially for beginner levels. Banos limited the justified use of L1 as follows: when you feel that it is more important for students to understand a concept than it is for a concept to be explained, to solve a comprehension difficulty, when explaining instructions of tasks. L1 is also justified to resolve a conflict or to solve a behavioral problem. The opponents of using L1 while teaching L2 seem to be very strict concerning this issue.

[13-14] It was pointed out that whatever justification is claimed for the English only classroom is based on two arguments: first the rejection of the Grammar Translation Method and second the false assumption that an English only requirement is an essential element of modern communicative methodologies. He suggested a mixture of the best in Grammar Translation Method with the best in Communicative method. He called the mixture “The Functional—Translation Method”. He also stated four areas behind the failure of the Grammar Translation Method. First, thinking in the mother tongue inhibits thinking directly in the target language. Mother tongue interposes an intermediate process between the concept and the way it is expressed in the foreign language thus hindering the ability to think in a target language. Such process called interference. Second, the mother tongue is a crutch: the more quickly it is disposed of the better. Third, too much reliance on L1 will result in the fossilization of an intra-language that is neither L1 nor L2. Fourth, the use of L1 is a waste of time that had better be spent on the target language.

[15] Three main arguments have been described for L1 avoidance. First, he said that L2 learning should model L1 acquisition of unilingual. Second, successful L2 learning requires the L2 learners to keep the L1 and the L2 as separate entities. Third, students will not be convinced that the L2 is a viable and effective means of communication if the teacher does not promote it.

[16] A study has been conducted about listening problems encountered by EFL learners at Damascus University, Syria. Besides listening problems, Hasan investigated learners’ strategies, characteristics of the speaker, features of the listening text, attitudes of the listener, etc. The study concluded that EFL learners at Damascus University experience a range of listening problems.

Also the curricula has been examined a number of English departments at Arab universities (the University of Baghdad, Iraq; Damascus, Syria; Kuwait, Kuwait; Yarmouk, Jordan; Amman, Jordan) and at two American universities in the Middle East, and concluded that the curricula of these departments (with the exception of the American University of Beirut) were heavily dominated by the literature component. He adds that “the study of English literature does not only dominate the syllabus of the English department, but also shapes the syllabus of the secondary schools” (1983). According to Zughoul, in English language and literature “the other two
components of the syllabus – namely, language and linguistics – show a lack of balance in the curriculum, where the language component in particular stands out as the weakest” (1987). The language component typically includes two courses in communication skills and a course in writing. Zughoul (ibid.) claims “Rarely does a department in a TW country offer solid language training, i.e. training in reading comprehension, listening comprehension, term paper writing, or speech. In fact, the curriculum assumes that the incoming student is proficient in the language and that he does not need any further language training. This, indeed, is a very unrealistic assumption”.

[17] Furthermore, about one-third of the Bachelor degree courses are taught in Arabic, especially in the Faculty of Arts and Education. These courses include Islamic Studies, Arabic, Social Studies, History, Computer Science and Education. I think that the remainder of the courses may not be enough to help those graduates communicate freely and effectively in the target language. They are thus likely to face some difficulties in their performance. The researcher suggest that, it would be better and helpful if such courses were taught in English rather than in Arabic. Halliday et al., when discussing ways of learning a foreign language, say: “In Nigeria, English is used in almost all the teaching in high schools. This has two important results. In the first place, the quantity of classroom experience that each pupil receives is much greater outside the English lesson than within it. Some people have said that if the English language lessons were removed entirely from the schools in Nigeria, little or no effect would be noticed on the ability of the pupils in English when they came to leave schools. However, in the second place, class teachers other than those who are trained in English influence the children. If those teachers’ English is not very good, the pupils will suffer. Teaching in a language is an excellent way of teaching a language, but all those who teach subjects in the foreign language need to be able to perform well in it themselves.”

[18] It would be even more advisable to use English in teaching all the courses at university level, therefore, the opinion that all university courses except Arabic language course(s) should be taught in English, which would certainly improve the university students’ linguistic ability, which would, in turn, improve their communicative competence.

[19-20] Moreover it has been claims that the school graduates lack the knowledge, which might help them to communicate. Basing his arguments on his observations and his personal experience, he claims that the transition from an introductory level, i.e. school, to a more advanced level, i.e. the university, is “as difficult as passing from the lack of knowledge to an introductory level”.

[21-22] also supports Suleiman’s point of view when he questions the competence of the incoming students: “In fact, it can be safely generalized that the linguistic competence of the incoming student and, for that matter, even the graduate from a TW university, does not enable him to make sense of a literary piece, let alone appreciate it”. [23-24] argues that the most noticeable problems which impede the progress of Arab students at university level may be attributed to the “inadequate mastery of the four language skills; namely listening, speaking, reading and writing”. This supports [25-26] that English language departments should offer solid language training. Suleiman adds that the major problem faced by students who attend the university is that they find it difficult to communicate in the target language. According to Suleiman, mother tongue interference is not the only factor responsible, but also a lot more may be attributed to the teaching/learning process as a whole.

In order for language learners to use the language more successfully, they should be involved in real-life situations. But unfortunately, in Jordan English is used only as an academic subject, when it is taught in a school or at the university. Without practice, English or any other language cannot be acquired. English Language Department graduates do not have enough practice in English; they use Arabic most of the time even after becoming English language teachers. They only use English when they encounter a situation where they are obliged to use English as a medium of communication and, to tell the truth, this hardly ever happens. We may therefore come to the conclusion that most of those graduates’ speaking time is in Arabic. Practice is very important for mastering any language.

[27] It has been suggested that: “Oral mastery depends on practising and repeating the patterns produced by a native speaker of the foreign language. It is the most economical way of thoroughly learning a language… When one has such a control of the essentials of a language, he can almost automatically produce the usual patterns of that language”
This shows the importance of using the target language in language teaching. Teachers in Jordan use Arabic to teach difficult words and to explain English literature. This was indeed a feature of my teaching experience in Jordan, as I was at one time a schoolteacher. Vocabulary items are still taught in isolation, though the Communicative Language Teaching approach stresses the importance of teaching vocabulary items in context. Listening materials are not used by the majority of schoolteachers, which is most probably because of the limited number of cassette recorders and the large number of teachers at the same school. Therefore, teachers try to read dialogues to their students, and this does not provide the learners with the necessary native speaker model. This also demotivates the learners and makes them bored. Dialogues are designed to be read by two or three partners, not by the teacher alone, who would read role A and role B with the same voice and intonation. This is probably due to the effect of the audio-lingual method, which was used in Jordan until the early eighties. Teachers were taught by this method. Part of my experience as a teacher and teacher trainer, I feel that the Teacher-training programmes were not very successful in changing the teachers’ methodology. The adopted methodology is claimed to be eclectic and focuses on communicative approaches to language teaching, but because of teachers’ practices in the classroom it is more likely a grammar translation method.

Lack of the target language exposure as spoken by its native speakers could be another reason behind the English majors’ weakness in communication. Before 1983, the English Language Department at Yarmouk University used to bring over American groups in the summer to teach two English language courses. They used to teach ‘English Pronunciation’ and ‘Stress and Intonation’ in which students attended tutorials all day long. It was called “The English Village”. Most of the students’ speaking-time was in English since they were exposed to the target language as presented by its native speakers. That was a very helpful experience for English major graduates. Unfortunately, the English Department is no longer interested in doing this. In addition, currently about 94% of the professors in the English Language Department are native speakers of Arabic. In the academic year 2000/2001, there were two Americans professors out of a total of about 30 staff members. This means that the students might not have enough exposure to the target language as spoken by its native speakers, especially with respect to stress and intonation.(Web Journal 2003).

Motivation also plays an important part in improving and developing the learners’ communicative ability. Attitudinal studies conducted on Arab students, such as those of [32] [30-31] have consistently shown that Arab students are instrumentally motivated to learn English and that they are well aware of the utility of knowing English. This means that the main stimulus for learning English is instrumental, i.e. to achieve a goal, e.g. a career. It is true that some learners are integratively motivated, but they are in a minority. According to [33], those with integrative motivation have a genuine interest in “the target speech community” which the learner is “aspiring to become a member of”. But I do not think that there are many English majors who desire to be part of an English-speaking community. It might be true that a few of them have such desire, but the majority of English majors join the English language department because it will be easier for them to get a job with a BA in English than in any other specialization.

A series of studies conducted by Callahan and colleagues [34] ; Callahan, [35] ; Callahan, Wilkinson, Yasuko [36] [37] [39] , for instance, have found that ELs are disproportionately more likely to be placed in low-level courses, which in turn leads to low academic achievement (see also Callahan &Shifrer, this volume). Particularly alarming is their finding that students’ placement in ESL classes itself, even when controlling for their English proficiency, contributes to lower academic achievement and reduced opportunity to take college preparatory courses, in a direct contradiction to the intent of the Lau Remedies [38].

Also, well-known study on ELs’ transition from high school to a community college found that the same ELs were perceived and treated quite differently in high school and in college. Harklau’s EL participants were considered model students in high school, and yet when they moved onto a community college, they were perceived as troublemakers. Likewise, Kanno and Varghese’s (2010) recent interview study of ELs who had been admitted [41] to a major public university identified both linguistic and nonlinguistic barriers to ELs’ pursuit of four-year college education. They found that although the ELs reported significant linguistic challenges, such as academic reading [42] and writing, they found such challenges to be manageable. What they found much
harder to overcome were nonlinguistic barriers; more specifically, institutional barriers that applied only to ELs (such as remedial ESL requirements) and financial stresses. They also reported that many ELs eliminate themselves from applying to four-year institutions, assuming that four-year colleges are beyond their reach.

METHODOLOGY

The aim of the present study is to investigate and analyze about 12% of the population of the whole university students and also who studied English course/s as a university requirement. Who suffer a low achievement level in English language.

This study adds to the studies so far conducted in the area of low achievement in English language in general and Sudanese EFL (English as a Foreign Language) learners, in particular.

Population of the Study:

The sample has been systematically selected for this study and has chosen from among the students who joined the three universities namely: the Al-Nee lain University, AL-Sudan University and Al-Khartoum University, during the first semester of the academic year 2014/2015., the students have all completed at least six-seven year courses in English. They were advised to read each question carefully before choosing the appropriate answer.

In fact, the items of the questionnaire and interview questions test were constructed using actual questions. However, the validity of the pre-test items was also measured by an analysis and it was found that the correlation was 0.90, and therefore significant.

Samples of the Study:

In the current study, the sample will consist of (120) students from different majors, faculty in Sudan universities students’ who studied English course/s as a university requirement. “Table 1” shows the distribution of the sample of the study according to the university. Table 1, Appendix A shows the Distribution of the Sample of the Study, at Khartoum locality of education in the Middle of Sudan in the academic year 2014/2016.

All the members of selected groups have similar characteristics. Their ages ranged from 19 to 22 years. They have been learning English as a foreign language since 7 years. The common language spoken at home and school is their own mother-tongue, which is _Arabic_. They live in an exclusively Arabic-speaking community where informal Arabic is their medium of instruction, and the only way to learn and speak English is through formal instruction at University. They receive an equal amount of experience in English at University that is two periods of English per week with each period being range between 60 - 90 minutes.

Tools of the Study:

As the main concern of the present study is to investigate reasons behind Sudanese university students’ low achievement in English language from students’ point of view, (questionnaire, interview and the observations,) has been designed and employed in the study for various reasons.

Researchers, such as Popper, (1959), reprinted (2004) by Rutledge, Taylor & Francis, stated that there were several advantages in using questionnaires instead of using others.

Researchers, such as Popper, (1959), reprinted (2004) by Rutledge, Taylor & Francis, state that there were several advantages in using questionnaires instead of using others.

Questionnaire:

Questionnaire is the most commonly used method of gathering information because it is less costly way to reach more people, including people at some distance. Depending upon the method of distribution, it can be swiftly done and data analysis can begin right away. The questionnaire keeps away from interviewer bias, guiding and cues that can impact the legitimacy and reliability of the data collection. A questionnaire is a set of questions for gathering information from individuals and can administer questionnaires by mail, using face-to-face interviews, as handouts.

Testing questionnaire before possessing will help the researcher to find out if participants will understand the questions, if the questions mean the same thing to all participants, if it provides the researcher with data he needs, and how long it takes to complete. Test the questionnaire with a small group who are similar to the intended participants.
DATA ANALYSIS

The objective of the research is to present the results of testing the three hypotheses that form the basis of this study and also to analyze the data provided by questionnaire.

The research is therefore divided into two parts, which keep in touch to the three following hypotheses:

1- There are no differences in the reasons behind Sudanese university students’ low achievement in English language due to students’ university.

2- There are no differences in the reasons behind Sudanese university students’ low achievement in English language due to students’ level.

3- There are differences in the reasons behind Sudanese university students’ low achievement in English language due to teachers’ and syllabus.

The researcher performed statistical test named t-test to test the opinion of the respondents were positive (weighted mean was greater than “60%” and the p-value was less than 0.05), or the opinion of the respondents in the content of the sentences were neutral (p-value was greater than 0.05) or the opinion of the respondents in the content of the sentences, were negative (weighted mean was less than “60%” and the p-value less than 0.05).

Table 2, Appendix A In the pre-test interviews with six departments viz. CE (College of Engineering); CL (College of Law); BM (Business Management); Math (Mathematics); PS (Political Science); Med (Medicine).

A major complaint was that the English language used in their EMI—English-medium instruction” subject courses was much more complicated and difficult than what they had learned in their simplified GE (General Education) courses. In fact, this gap between the GE courses and the English language skills needed for the EMI courses has already been pointed out by many scholars (e.g., Dudley & St John, 1998; Evans & Green, 2007; Hutchinson & Waters, 1987; Swales, 1988; Widdowson, 1998).

About 80% of the students from all the six departments felt dissatisfied with or at least neutral (i.e., no especially negative feelings) towards their English course results explained, at least to some extent, by other questionnaire data about the amount of English actually used in the classroom.

The Status of English language courses in Sudan Universities: Figure 1, Appendix A

In Sudan English is taught as a foreign language and university students must pass an English course/s which is considered one of the university requirements. The following is the course description at each university:

AL-Nee Iain University - General English Course Description:

The course (General English) based on two credit hours, which is designed by (teacher) to improve the students accuracy in the use of grammatical categories and their functions. It also includes activities aiming for developing students’ competence in linguistic and communicative skills. This is achieved through the use of authentic texts related to Sudanese, British and American cultures.

AL-Sudan University General English Course Description:

At this university, students learn volume of remedial English courses: (English-1 in first semester) and General English in second semester. English-1 is a two credit hours, general remedial course that is aimed to improve students overall proficiency in English. Also it aims at revising the language skills that students studied at school. On the other hand, English 2 is another two credit hours course which aims at covering issues not covered in English 1. These two courses concentrate on the skills of listening, speaking, reading and writing as well as on the functional use of language.

AL-Khartoum University General English Course Description:

Course based on Headway Pre-intermediate course three credit hours. It aims at reinforcing the student’s vocabulary, live skills, grammar, reading skills and writing. As the book flows, it teaches the students the basic skills in English situations. Thus, the students can deal with English in their daily-like situations. Lots of exercises, examples and events are discussed for the purpose of teaching live material.

With reference to the above information which
observed that Al-Khartoum University has chosen three credit hours for teaching English as a foreign language while the other two universities have allotted two credit hours for teaching the course. This is considered to be as an advantage of Al-Khartoum University which has reviewed the recent situation of the English language in Sudan and tried to polish it up by assigning more credit hours for teaching this course.

Figure 1, Appendix A shows the Degree of dissatisfaction with different departments

CE = College of Engineering; CL = College of Law; BM = Business Management; Math = Mathematics; PS = Political Science; G = Geography. Figure (1.4) reveals the degree of satisfaction with different departments.

Figure 2, Appendix A

In real teaching situations, English is used ONLY about 40% of the class time and the courses carrying the label of “English-medium instruction (There is a movement from English being taught as a foreign language (EFL) to English being the Medium of Instruction (EMI) for academic subjects such as science, mathematics and geography.).” For many complex reasons (e.g., students’ low proficiency in English, subject content, and time pressure), many of the courses were not actually conducted primarily in English. The amount of English language used varied greatly not only across different departments but across different courses within the same department. This result has confirmed in a recent corpus-based study on English lectures given by Sudanese teachers at the same university.

Achievement in inability English language due to syllabus variable. Table 3, Appendix A

Based on both students’ questionnaire data and the interview data collected from the teachers and students, it seems that the Sudanese teachers at universities often switched from English to Arabic during the class under the following circumstances: (1) When students looked confused; (2) When students asked for an explanation in Arabic; and (3) When the concept introduced was difficult.

Students’ achievement inability in English language due to students’ grade variable Table 4, Appendix A

Some of the teachers even repeated the content in Arabic after every chunk of lecture given in English. The switch between the native and the target language reflects the Sudanese teachers’ awareness of students’ potential difficulties. This considerate attitude might help to reduce students’ anxiety level, hence increasing the degree of their satisfaction with English courses.

In addition, the interviews conducted with the six teachers of six different departments, researcher found that for various reasons (such as large class size, limited class time and students’ poor writing and speaking abilities), these teachers usually just “encouraged” their students to try to speak English in class and to answer their test questions in English, rather than forcing them to do so. This again helped to reduce students’ anxiety level.

Findings

To help Students Bridge the gap between the simple language skills and comprehension texts that they used to study in university, they need academic lectures, reference material, texts and assignments that students will come across during their university studies. So the material designed by teachers (in-house) was not effective and did not cover all skills and topics also universities should:

Give more attention to Language teaching at universities. This will produce students with good command of English.

Training programs for teachers, workshops, increasing the number of periods for English per a week will help in this regard.

Encourage student-student interaction in order to give students more chances to communicate. Classes need to be more student-centered than teacher-centered.

Variety of methods of teaching will have much better impact on students.

Physical facilities, technology and materials, and university resources all contribute in facilitate student problems’.

Great difference in curriculum from university to university, provide uneven results for students, and the achievement gap observed in diverse in students’ level, including student’s weakness.

It claims that more attention to the curriculum evaluation because there was still a lot of confusion
about universities’ responsibilities in this area.

Differences between cultures play a very important role in teaching English. The more teachers are aware of cultural differences the better they can help students understand - and use - English in native speaking countries. Culture is something very important that when students are separated from their culture, they will be at a loss and under such circumstances learning is so hard. To teach a foreign language is also to teach a foreign culture, and it is important to be sensitive, therefore, teachers must remember to respect the culture in which they are located.

**RECOMMENDATION**

Based on the results of this study, the following recommendations can be made in order to improve and smooth the progress of the learners and teachers:

- **a.** Students should be motivated to acquire a confidence whenever they make mistakes in language classrooms.

- **b.** English teachers should equip well-training courses at the Faculty of Education.

- **c.** Students should be encouraged to practice English language with native speakers inside classrooms.

- **d.** The curriculum designers should think about the learners’ needs in language learning when they plan to design curriculum.

- **e.** It is recommended that the teachers should be familiar and aware of the most recent TEFL (Teaching English as a Foreign Language) and CELTA (Certificate in English Language Teaching to Adults) methods which leads to develop university English programs and to effective TEFL Methodology.

**Appendix A**

**Table 1.** Appendix A shows the Distribution of the Sample of the Study.

<table>
<thead>
<tr>
<th>N.</th>
<th>University’s Name</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Al-Khartoum University</td>
<td>15</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>Al-Nileen University</td>
<td>15</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>AL-Sudan University</td>
<td>15</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>45</strong></td>
<td><strong>45</strong></td>
<td><strong>90</strong></td>
</tr>
</tbody>
</table>

**Table 2.** Appendix A In the pre-test interviews with six departments

<table>
<thead>
<tr>
<th>Field</th>
<th>Source</th>
<th>Sun of Square</th>
<th>Mean Square</th>
<th>F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reasons behind Suanese university students’ achievement inability in English language</td>
<td>0.277</td>
<td>0.567</td>
<td>1.237</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Between Groups</td>
<td>0.568</td>
<td>10.152</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>0.133</td>
<td>12.152</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.133</td>
<td>12.152</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Achievement in inability English language due to syllabus variable. Table 3, Appendix A**
Figure 1, Appendix A shows the degree of dissatisfaction with different departments.

![Graph showing the degree of dissatisfaction with different departments]

Students’ achievement inability in English language due to students’ grade variable Table 4, Appendix A

<table>
<thead>
<tr>
<th>Field</th>
<th>Source</th>
<th>Sun of Square</th>
<th>Mean Square</th>
<th>F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons behind Sudanese university students’ achievement inability in English language</td>
<td>Between Groups</td>
<td>0.409</td>
<td>0.136</td>
<td>0.885</td>
<td>0.453</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>11.724</td>
<td>0.154</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12.133</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REFERENCES

[1]. Ahmad, M. E. 2013; Errors of English Language Committed by Sudanese Students at Secondary Schools in Khartoum Locality. Postgraduate Diploma in Education. Open University of Sudan.


[5]. Al Jayoussi, 2011; Spelling Errors of Arab Students: Types, Causes, and Teachers’ Responses (master’s thesis). American University of Sharjah, the UAE.


[7]. (Abbasi, Ahmad and Khattak 2010; Investigating Learning English Strategies and English Needs of Undergraduate Students at the National University of Laos.

[8]. Abdulhalim 2006; Developing English Language Teaching at Tertiary Level in Sudan Edited by Ben Gray & Mark Krzanowski.


[10]. Chang 2010; indicated that reasons cause students’ weakness for English language.
learning derived from learners’ laziness, lack of efficiency of the school, and insufficient of parents’ promotions.


[13]. Ghenghesh; HamedandAbdelfattah 2011; Conducted a research to investigate the perceptions of English language needs of undergraduate business students and their business faculty at the British University in Egypt.

[14]. Evans; Green, 2007; and Kirkgöz 2009; Learning subject matter through English as the medium of instruction: students’ and teachers’ perspectives

[15]. Elsheikh, 2010;this study suggests that Sudan is one of the countries of the expanding circles. Therefore, the importance of English language will continue in Sudan as the economy is growing; and the country is now exporting natural gas and is seeing more and more foreign investment.


[17]. Guo,2006; As ‘a nationwide standardized test, aimed at an objective assessment of English proficiency of Chinese college students and a source of effective feedback for college teachers to use in improving their classroom teaching’. From this definition, it is clear that the functions of CET have been extended to include the evaluation of the curriculum as a whole.

[18]. Graddol, 2006; ENGLISH AS AN INTERNATIONAL LANGUAGE CHALLENGES AND POSSIBILITIES.


[22]. Hashemi 2011;Language Stress And Anxiety Among The English Language Learners This paper can be cited as: Qahtani, H.2018; Exploring Students’ Weaknesses in English Language AtShaqra University (Hurimlaa Campus), Saudi Arabia. People: International Journal of Social Sciences, 3(3), 1299-1319.

[23]. Hashemi, 2011 and Susanna, 2007;Factors Causes Students Low English Language Learning: A Case Study in the National University of Laos

[24]. Khader;Shaat, 2010; Investigated the reasons behind Palestinian university students’ achievement gap in their English language skills.

[25]. (Khattak; Jamshed; Ahmad, andBaig, 2011; Besides, a survey into the causes of English language learning anxiety in students also found that students were afraid of making mistakes in the classes, failing the exams, as well as the poor socioeconomic background cause of the poor performance in learning languages.

[26]. Lei, 2012; Thang et al., 2011; At present, many numbers of Lao students have failed in their English language learning because of lack of motivation from some elements such as family background, social-environment, physical environment, culture, methods of learning and so forth.

[27]. Loae, 2011;Problems Encountered by Arab EFL Learners.

[28]. Louis, 2008;This study investigates that for ESP students pursuing engineering and science majors (EST), the acquisition of reading comprehension skills is vital as it will be required by students once they begin to take courses in their majors.

[29]. Nzama, M. V. 2010; Error Analysis: A Study of Errors Committed by IsiZulu Speaking Learners of English in Selected Schools (Master’s thesis), University of Zululand, South Africa.
[30]. Muhammad, T. 2007; Investigation of the factors that cause language anxiety for ESL/EFL learners in learning speaking skills and the influence it casts on communication in the target language. Master of Education in English Language Teaching Pathway, University of Glasgow.

[31]. Siphong, 2008; In general secondary school, students have studied English for two hours per week, which was not sufficient for English proficiency. Most students were not motivated to study English. Furthermore, all English documents were destroyed because the significance of this language was ignorant.

[32]. Siphong 2008 and John; Ehow 2011; describes that nowadays, the English language has been introduced in the school curriculum from lower secondary school level as a compulsory course in 1997. Unfortunately, English is not currently officially taught in government primary schools.

[33]. Susanna, 2007; Background English is not only use as an official language in many nations, but also influence on many different cultures in a large number of countries; it is the central language of communication in the worldwide.

[34]. Susanna, A., 2007; The weak language learner: a study of ways of taking weak language learners into consideration in class. Sweden: VaxjoUniversity, School of Humanities English, GIX115.

[35]. Souvannasy et al 2008; While, a study of the determinants and issues in student achievement in English at the Lao secondary education level found that a majority of Lao secondary students have a problem with basic vocabulary skills which influence reading comprehension and the content of textbooks difficulty. Causes of Weakness in English Language Learning The development in the quality of English language learning have not satisfaction towards the demands of the society in Laos. This is because of lack of several factors to support the learning and teaching approaches.

[36]. Shaaban, 2009; Says: In fact, the abandonment of English has created generations of graduates whose skills were considered deficient on account of the fact that their English language skills were not up to the level required by the job market, especially in the age of globalization and outsourcing. Recently, most Arab governments have reversed their earlier policies, introducing English at an earlier age, mostly in the first grade and going a little further than expected by adopting English as a medium of instruction for science, mathematics, and technology.

[37]. Schleppegrell, 2007; To date, ELLs face a substantial and well documented math achievement gap relative to other groups of students.


[40]. Woodrow, 2006; The research studies 275 EFL students who participated in an English-for-Academic-Purpose course in an Australian university.


[42]. Ying, 2008; Other objectives of CET are introduced to: 1. Motivate fulfillment of the national curriculum, and 2. Evaluate college students’ English ability (Li, 2009). Moreover, CET’s designers claim that one of the expected results of their model was to ‘drive students to learn English in a qualitative way’.

[43]. Zhou, 2012; Motivation can influence students’ freedom, attention, attempt, patient, the frequency of using learning strategies, and their learning success.


Design of Mixed Radix-2, 3 & 4 based SDF-MDC FFT for OFDM Application

K Periyarselvam¹, G Saravanakumar², M Anand³

¹Research Scholar, St Peter’s University, ²Dean & Professor, Department of Electronics and Communication Engineering, VelTech High Tech Dr. Rangarajan Dr.Sagunthala Engineering College, Avadi, ³Professor, Dr. M.G.R Educational and Research Institute University, Chennai

ABSTRACT

Pipelined architectures of Fast Fourier Transform (FFT), which are well-organized for long instances and it is significant for modern digital communication and radar systems. This paper present a design of Mixed Radix Fast Fourier Transform (FFT) processor for high speed DSP application like OFDM based communication systems such as digital audio and video broadcasting (DAB & DVB). The efficient design of mixed radix-2, 3 and 4 based Single path Delay Feedback (SDF)-Multipath Delay Commutator (MDC) FFT using MCSLA has been proposed for reducing the area and power consumption in this paper. An FFT using this algorithm is computed in an ordinary complex plane and the number of additions can be significantly reduced and the number of multiplication is also reduced. Modified carry select adder has been designed to reduce the hardware utilization. Finally, the MCSLA has been incorporated into mixed radix-2, 3 and 4 SDF-MDC FFT for improving the performance of architecture. The proposed architecture will be absolutely useful in OFDM based digital communication to perform the function of frequency transformation techniques. These architectures are designed by using ModelSim 6.3C tool and the synthesis results are evaluated by using Xilinx ISE 10.1 design tool.

Keywords- Fast Fourier Transform (FFT), Single path Delay Feedback (SDF), Multipath Delay Commutator (MDC), Orthogonal Frequency Division Multiplexing (OFDM).

INTRODUCTION

Fourier Transform is the analysis of the frequency domain signal. It is the basis of many signal processing and communication applications. The Fourier transform has many applications, in the field of physical science that uses sine wave signals such as engineering, physics, chemistry and applied mathematics, will make use of digital and discrete data. FFT reduces the computation time and improves the performance largely over the direct estimation of DFT, the FFT algorithm is one of the methods having high computational complexity in the physical layer of these communication systems. Hence, FFT architecture is presented for implementing the FFT computation efficiently.

The FFT algorithms are characterized into two general classifications, namely, the decimation-in-time (DIT) and the decimation-in-frequency (DIF) algorithms. In case of DIF algorithm, the input samples are fed to the computing structure in their natural order, while the output is generated in bit-reversed order. On the other hand, in case of DIT algorithm, the input samples need bit-reversal reordering before being processed, while the output FFT coefficients are generated in natural order. In different RFFT applications such as image and video processing, biomedical signal processing, and time-series analysis etc., the complete input sequence is generally available together at the same time for the FFT computation.

DFT is very essential for various reasons that efficient calculation has been developed as a well-analyzed subject for quite a long time. To find out the DFT more rapidly and with less complexity, Fast Fourier Transform algorithms have been created which are commonly known as FFT. Some FFTs are Cooley-Tukey algorithm, divide and conquer approach, Radix-2 etc. In this paper, an improved version of Radix-2, Radix-3 and Radix-4 FFT algorithm has been developed.
which is much efficient. The main aim is to design a high performance of radix-2, 3 and 4 FFT circuit which has high throughput, less area and also reduced the hardware resources.

**LITERATURE SURVEY**

This paper explains a unified set of algorithms that identify the intra-connection and phase rotation architecture of FFT flow graphs for arbitrary FFT’s. The similar set of fundamental equations is applied to arbitrary length FFT’s, mixed radix FFT’s, either decimation-in-frequency or decimation-in-time FFT’s, FFT’s with ordered inputs, ordered outputs or both ordered [1]. An expandable multipath delay commutator based FFT structure has been explained in [2] It can be easily and flexibly extended to satisfy throughput-hungry applications. The hardware design generator, which is proficient of automatically producing an FFT core under a given throughput constraint.

A general mixed radix algorithm has been developed in [3] to optimize the design of memory based FFT processor. It supports the in-place strategy for both butterflies output and I/O data to reduce the required memory size. Hence, only 2N words memory is required for any size FFT computation for real-time requirements. The hardware efficient GHR reconfigurable FFT processor has been explained in [4]. The GHR processor based on radix-25/16/9 utilizes a 2-D factorization method as the high-radix unit and a 1-D factorization method. The GHR combines 2-D and 1-D factorization techniques and improves the throughput.

A new high-performance scalable mixed radix-2^n serial–serial multiplier has been explained in [5]. It has been designed by transferring the digit serial–parallel multiplier, which needs one of the operands to be available at each cycle, and therefore loaded in parallel, to a structure that needs only two digits of that operand to be available at any one cycle. An efficient approach to calculate DFT using Radix-3 algorithm has been presented in [6]. It takes less multiplication than normal one. Radix-3 FFT is more efficient than Cooley-Tukey Method. In [7] the GPS signal is acquired using time domain correlation, radix-2 and radix-4 FFT based acquisition algorithms. The simulated GPS signal of one millisecond is utilized for testing the algorithms.

**Radix-2, Radix-3 and Radix-4 FFT Algorithm**

Radix-2 FFT algorithm calculates the FFT in following three levels a) Decompose an N-point time domain signal into N number of separate signals such that each consists of a single point. It is a multistage interlaced decomposition where odd indices and even indices get separated. b) Calculate the N frequency spectra corresponding to N time domain signals. c) Synthesize the resulting N number of spectra into a single frequency spectrum. In Radix-2 FFT consists of two types, one is Decimation in Time (DIT) FFT and next one is Decimation in Frequency (DIF) FFT.

\[ X_k = \sum_{n=0}^{N-1} x_n w_n^{nk} , 0 \leq k \leq N-1 \]

**Figure 1. Radix-2 FFT**

Radix-3 algorithm is mainly based on divide and conquer method. It decomposes an N point DFT into consecutively smaller DFTs. When the number of data points are power of 3 (i.e., 3^n), it is efficient to execute radix-3 algorithm. Similar to the radix 2 FFT it is probable to divide a DFT into radix 3 units, if the original DFT is of a size that can be factored down to one or more threes, i.e., N = 3^n.

**Figure 2. Radix-3 FFT**

Radix-4 FFT algorithm which was used to enhance the speed of functioning by reducing the computational path. If base increases, the power/index will decreases. Radix-4 FFT the number of stages are reduced to 50%. It is having four inputs and outputs and it follows in-place algorithm. The shorter FFT outputs are reused to
calculate many outputs, thus the total computational cost is greatly reduced. The radix-4 FFTs need only 75% as many complex multiplications as the radix-2 FFTs.

**Figure 3.** Radix-4 FFT

**Proposed Mixed Radix-2, 3 and 4 SDF-MDC FFT using MCSLA**

The proposed Mixed Radix-2, 3 and 4 Single path Delay Feedback (SDF) –Multipath Delay Commutator (MDC) FFT has been designed in this work. The architecture of mixed radix FFT has a less number of computational stages and also improves the performances of FFT processor. SDF and MDC have a various type of advantages as far as VLSI parameters like less area utilization, low power consumption, and high speed. In this paper, the 16-point Mixed Radix-2, 3 and 4 SDF-MDC architecture has been designed to use a single path delay feedback in the first stage and multipath delay commutator has been used in all other stages. Single-Path Delay Feedback FFT structures have the most productive memory usage for pipelined FFT processors. SDF FFT makes utilization of delay-lines developed using memory and shift registers to reorder information at each butterfly stage. The most straightforward type of pipelined architecture is Multi-Path Delay Commutator. Each and every pipeline stage relates to one segment of the signal flow graph, and the CE calculates the input data.

**Figure 4.** Flow Diagram of 16-point Mixed Radix-2, 3 and 4 FFT

**Figure 5.** Proposed Architecture of Mixed Radix-2, 3 and 4 based SDF-MDC FFT
Figure 4 shows that the flow diagram of 16-point Mixed Radix-2, 3 and 4 FFT. Figure 5 shows that the proposed architecture of Mixed Radix-2, 3 and 4 based SDF-MDC FFT. To implement pipelined radix-2, 3 and 4 FFT using SDF-MDC architecture, it requires 1 SDF stage and 2 MDC stages helps in achieving 100% hardware utilization of adders and multipliers used in this architecture. In the existing Mixed R2SDF-R4MDC FFT, the number of computational stages are high. Compared to existing method, the less number of computational stages are used in the proposed method. In this proposed architecture consists of processing elements, delay elements and commutators. The operation of normal addition and subtraction is done in the processing element. Here, the modified carry select adder is used for the addition operation. This adder structure is very efficient in this architecture. In the existing Mixed R2SDF and R4MDC FFT, the inputs are given into sequentially and the sixteen inputs are processed along with the help of Processing Element unit. More Hardware utilization and high power consumption in the existing method. To overcome this problem, the design of Mixed radix-2, radix-3 and radix-4 based SDF-MDC FFT architectures has been developed to reduce the hardware utilization of the processor. And also reduces the computational stages than the existing method.

RESULTS AND DISCUSSION

The proposed Mixed radix-2, 3 and 4 based SDF-MDC FFT using MCSLA has been simulated by using Modelsim 6.3C and it can be synthesized by using Xilinx ISE 10.1i. The simulation result of 16-point Mixed radix-2, 3 and 4 based SDF-MDC FFT using MCSLA has been illustrated in Figure 6. In the proposed Mixed Radix-2, 3 and 4 based SDF-MDC FFT using MCCLA has been compared with the existing Mixed R2SDF-R4MDC FFT [8]. Comparison analysis of existing Mixed R2SDF-R4MDC FFT [8] and proposed Mixed Radix-2, 3 and 4 based SDF-MDC FFT using MCCLA is shown in Table 1.

![Figure 6. Simulation result of 16-point Mixed radix-2, 3 and 4 based SDF-MDC FFT using MCSLA](image-url)
Table 1. Comparison analysis of existing Mixed R2SDF-R4MDC FFT[8] and proposed Mixed Radix-2, 3 and 4 based SDF-MDC FFT using MSCLA

<table>
<thead>
<tr>
<th>Types of Parameters</th>
<th>Slices</th>
<th>LUTs</th>
<th>Delay(ns)</th>
<th>Power(W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Mixed R2SDF-R4MDC FFT[8]</td>
<td>2614</td>
<td>4258</td>
<td>26.244</td>
<td>2.397</td>
</tr>
<tr>
<td>Proposed Mixed Radix-2, 3 and 4 based SDF-MDC FFT using MSCLA</td>
<td>1211</td>
<td>2084</td>
<td>24.315</td>
<td>1.048</td>
</tr>
<tr>
<td>Percentage Reduction</td>
<td>53.67%</td>
<td>51.05%</td>
<td>7.3%</td>
<td>56.27%</td>
</tr>
</tbody>
</table>

From the above Table 1, it is clear that the number of slices is 2614 and 1211, the number of LUTs is 4258 and 2084, the delay is 26.244 and 24.315 and the power is 2.397 and 1.048 in the existing and proposed method. When compared to existing method, the proposed method gives better performances. Performance Evaluation of Existing and proposed Mixed Radix-2, 3 and 4 based SDF-MDC FFT using MSCLA is shown in Figure 7.

Figure 7. Performance Evaluation of Existing and proposed Mixed Radix-2, 3 and 4 based SDF-MDC FFT using MSCLA

CONCLUSION

In this paper, the proposed 16-point Mixed Radix-2, 3 and 4 based SDF-MDC FFT using Modified Carry Select Adder has been designed through Very Large Scale Integration (VLSI) System design environment for OFDM application. The main aim of this work is to reduce the area, delay and power consumption of the processor and also reduces the computational stages. The proposed Mixed Radix-2, 3 and 4 based SDF-MDC FFT using MCCLA architecture offers 53.67% reduction in slices, 51.05% reduction in LUTs, 7.3% reduction in delay and 56.27% reduction in power consumption than the existing Mixed R2SDF-R4MDC FFT. In future, the proposed 16 point Mixed Radix-2,3 and 4 based SDF-MDC FFT will be extended to 32,64,128 point of FFT transformation and it will be integrated in MIMO-OFDM application for improving the process of data communication.

Ethical Clearance- Taken from St. Peter’s University

Source of Funding- Self

Conflict of Interest - Nil

REFERENCES


Second Order Sliding Mode Control of Three Phase Four Switch VSI Fed Fault Reconfigurable Sensor Less PMSM Drive

Ashok Kumar R¹, Balaji K²

¹Research Scholar, ²Associate Professor, Department of Electrical and Electronics Engineering, St. Peter’s Institute of Higher Education and Research, Chennai, Tamilnadu, India

ABSTRACT

Short circuit switch faults in PMSM drives results in improper response of drive and reconfiguration of such a faulty drive requires manual interruption. Hence an online fault reconfiguration scheme is required for continuous and stable operation of drives. Single phase short circuit fault identification and reconfiguration system for three phase four switch inverter fed sensor less PMSM drive is proposed. Fault Reconfiguration system involves an additional leg with two switches and TRIACs connected in each phase of inverter and also in additional leg. Fault is detected based on over current flow in any phase of motor due to short circuit faults. Fault reconfiguration system involves opening of TRIAC in a faulty phase and closing of TRIAC in additional leg. This method does not require any additional changes in hardware to identify fault and the time taken for fault identification and reconfiguration is short such that the over current is suppressed within its first cycle. In addition to fault reconfiguration scheme, a second order sliding mode controller for speed control of PMSM motor is proposed. This controller converges faster and has finite reaching time and settling time even if system has non linearity including system parameters variation with time. To validate the performance of proposed speed controller and fault reconfiguration scheme for three phase four switch inverter fed sensor less PMSM drive is simulated in MATLAB/Simulink environment.

Keywords: Fault Reconfiguration, Short Circuit Fault, Second order sliding mode controller, Triode for alternating current (TRIAC), Sensor less control.

INTRODUCTION

Permanent magnet synchronous motors (PMSM) with low inertia [¹-²] are preferred for ac motor control applications, since small amount of power is sufficient to run the motor and it has certain merits compared to other ac motors like high efficiency, high load torque and low noise. Control of such PMSM motor is a challenging task due to the complexity of drive system and reliability of any ac drive is a crucial factor to give satisfactory performance in the presence of faults [³]. Short circuit switch faults occur in any ac drive system. With recent advancements in power electronics, a fault tolerant system [⁴-⁶] is required for stable and continuous operation of electrical drives. A fault tolerant system includes a fault identification [⁷-⁹] mechanism at the instant of occurrence of fault and a reconfiguration system which enables operation of drives at steady state even after the occurrence of fault.

In addition to drive performance under faults speed control of PMSM motor is also addressed in the proposed system. Sliding mode controller [¹⁰-¹¹] has great impact of controlling speed of PMSM motor with large disturbances and it settles to reference speed faster in comparison with classical PI controller employed for PMSM speed regulation. Dynamic speed controller is proposed with a second order sliding surface which has faster convergence when compared to sliding mode controller with first order sliding surface. Speed and position of PMSM motor is estimated based on terminal voltages and currents in order to avoid the use of position and speed sensors. Various speed estimation methods are suggested in the literature [¹²-¹⁵] based on observers. Hardware implementation of sensor less PMSM drive based on extended Kalman filter [¹²] has shown improved performance of sensor less drive, but it has computational complexity. The main disadvantage
of EKF is it is based on measuring system noise and measuring noise is difficult. Hence observers are used for sensor less speed estimation using direct estimation method based on back EMF or through MRAS and SMO [13]. Block diagram of fault reconfigurable sensor less PMSM drive is shown in figure 1. The proposed fault reconfiguration system is based on redundant hardware circuit. After the occurrence of fault additional leg with two switches is connected to motor through TRIAC and the leg where fault has occurred is made redundant by opening the TRIAC in that phase. The proposed fault reconfiguration system corresponds to faults quickly ensures stability of the drive during short circuit faults.

**PMSM Model**

A simplified model of PMSM is required for implementation of advanced speed control strategies, fault diagnosis schemes, speed and position estimation methods. Even with the presence of non-linearity in the model, it is assumed that developed back EMF of PMSM motor follows sinusoidal wave shape. Mathematical model of PMSM with second order speed loops and U is the response of second order sliding mode controller.

Equation (8) gives the sliding surface for second order sliding mode controller [17]:

\[ v = x_1 + \frac{1}{2} x_2^2 \]

\[ U = \omega_{ref} + \beta \frac{x_2}{2} + \frac{1}{2} x_2^2 + k \sigma (x) \]

\[ i_q^* = U - \frac{K_q}{K_p} \frac{d \omega}{dt} - \frac{K_i}{K_p} \omega \]

Where \( k \) represents switching gain of second order SMC and \( \sigma (x) = \begin{cases} 1, & v > 0 \\ 0, & v = 0 \\ -1, & v < 0 \end{cases} \) is a standard sign function, \( \beta, p \) and \( q \) are constants such that \( \beta > 0, 0 < q < p \) and \( i_q^* \) is the output of second order SMC.

Speed response of three phase four switch inverter fed sensor less PMSM drive using second order SMC is shown in figure 2. It is observed that the rise time (0.02s) and settling time (0.03s) of speed controller using second order SMC is significantly reduced and it has faster convergence than first order sliding mode controller in reference speed tracking of PMSM motor.
Proposed Fault Diagnosis Scheme

Power circuit for fault reconfiguration system for single switch short circuit fault of three phase four switch inverter fed sensor less PMSM drive is shown in figure 3. This circuit is divided into two units based on fault free and faulty operation or fault reconfiguration scheme \cite{18}. Fault free mode of operation consists of three phase four switch inverter fed PMSM motor. It includes a DC source, two phase legs using four power switches and split capacitor leg for third phase. Fault reconfiguration system involves an additional phase leg with three TRIACS, one for connecting additional phase leg to motor phase during fault and other two TRIACS for disconnecting faulty phase from exciting motor.

Control Implementation of fault reconfiguration system responsible for closing and opening of TRIAC is shown in figure 4. It involves a current sensing circuit for fault detection and fault is identified based on over current flow in a faulty phase based on predefined threshold. TRIAC is an ac voltage control device and the switching pulses for turning on TRIACS must be synchronized with ac voltage. Phase locked loop is employed to generate synchronized pulses to control TRIAC during pre and post fault mode of operations. There are two modes of operation in this fault reconfigurable PMSM drive system. One is pre fault operation where the pulses to TRIAC U1 is kept at active low and pulses to G1 is generated using PLL scheme explained above. During this mode of operation motor is excited from three phase four switch inverter and additional leg is not used. Other mode of operation is post fault operation; consider a short circuit fault in first phase of machine due to power switch Q1. This exhibits over current phenomena in faulty phase and phase voltage reduces to zero. Hence...
speed of PMSM motor enters into an uncontrollable region and speed decreases with wide oscillations in speed response. Similarly torque developed by PMSM motor also introduces oscillations and overall efficiency of the machine is decreased. Hence after the occurrence of fault TRIAC G1 is given a low pulse and its switching pulse is switched to U1 to include additional phase leg to excite motor and exclude faulty leg from exciting motor. Similarly switching pulses of faulty leg with power switches Q1 and Q4 are switched to additional phase leg Q3 and Q6. Now faulty phase leg with switches Q1 and Q4 has become redundant leg, it is not needed for running the PMSM motor.

**SIMULATION RESULTS AND DISCUSSIONS**

Proposed speed control using second order sliding mode controller and fault reconfiguration system for three phase four switch inverter fed sensor less PMSM drive is simulated in MATLAB/Simulink platform and results are presented in this section. PMSM motor parameters applied in simulation are given Table I. Matlab implementation circuit is shown in figure 5. Control scheme of sensor less PMSM drive including fault tolerant control scheme is shown in figure 6. PMSM drive performance during fault without reconfiguration system is given from figure 7 to 10. Single switch short circuit is applied for short duration from t=3 to t=3.5 and response is observed. PMSM drive performance during fault with reconfiguration system is given from figure 11 to 14.
Figure 6. Control scheme of sensor less PMSM drive

TABLE I

<table>
<thead>
<tr>
<th>PMSM MOTOR PARAMETERS</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Stator Resistance (Rs)</td>
<td>2.72 ohms</td>
</tr>
<tr>
<td>Stator Inductance (Ls)</td>
<td>9mH</td>
</tr>
<tr>
<td>Rotor Speed</td>
<td>1500 rpm</td>
</tr>
<tr>
<td>Flux Linkage</td>
<td>0.175 V.s</td>
</tr>
<tr>
<td>Poles</td>
<td>4</td>
</tr>
<tr>
<td>Torque Constant</td>
<td>1.05N.m/A</td>
</tr>
</tbody>
</table>

Figure 7. Speed response of sensor less PMSM drive with fault

Figure shows speed tracking response of sensor less PMSM drive during single switch short circuit fault without fault reconfiguration system using TRIAC and the speed response shows that system is not stable during fault with desired speed of motor reduced to 500 rpm from 1500 rpm.
Figure 8. Torque response of sensor less PMSM drive with fault

Figure shows developed electro-magnetic torque response of sensor less PMSM drive during single switch short circuit fault without fault reconfiguration system and the torque response shows that system response is oscillating with torque varying from +30(n-m) to -10(n-m).

Figure 9. Phase voltage of sensor less PMSM drive with fault

R-phase voltage of sensor less PMSM drive during single switch short circuit fault without fault reconfiguration system is shown in figure and phase voltage is not symmetrical and zero in positive cycle. This leads to flow of high current into motor.
Figure 10. Current response of sensor less PMSM drive with fault

Stator current response of sensor less PMSM drive during single switch short circuit fault without fault reconfiguration system is shown and the current response shows that during fault current is about 200% of nominal value. Current flow during positive half cycle is not in symmetry with negative cycle.

Figure 11. Fault compensated Speed response of sensor less PMSM drive

Figure shows speed tracking response of sensor less PMSM drive during single switch short circuit fault with fault reconfiguration system using TRIAC and the speed response shows that system exhibits stable operation during fault with desired speed of motor stays at 1500 rpm.
Figure 12. Fault compensated torque response of sensor less PMSM drive

Figure shows developed electro-magnetic torque response of sensor less PMSM drive during single switch short circuit fault with fault reconfiguration system and the fault compensated torque response shows that drive is functioning properly even in the presence of fault.

Figure 13. Fault Compensated phase voltage of sensor less PMSM drive

R-phase voltage of sensor less PMSM drive during single switch short circuit fault with fault reconfiguration system is shown in figure and phase voltage is symmetrical with fault compensation scheme ensures proper excitation of motor.

Figure 14. Fault compensated current response of sensor less PMSM drive
Stator current response of sensor less PMSM drive during single switch short circuit fault with fault reconfiguration system is shown and the current response shows that during fault load current stays within nominal value. Hence over current during short circuit fault is mitigated with the help of fault reconfiguration system.

CONCLUSION

An online fault reconfiguration scheme is proposed for continuous and stable operation of PMSM drive. Single phase short circuit fault detection methodology and reconfiguration system for three phase four switch inverter fed sensor less PMSM drive is developed. Fault reconfiguration system used is more reliable, faster to respond to faults and over current that flows into motor winding due to short circuit fault is mitigated within the first cycle. Speed control problem using sliding mode controller is also addressed and a second order sliding mode controller design is presented for set speed tracking of PMSM motor. This controller has dynamic speed control response of PMSM drive system with non linearity and time varying parameters. Second order SMC has faster convergence and has utilized smaller rise time. The performance of proposed speed controller and fault reconfiguration scheme for three phase four switch inverter fed sensor less PMSM drive is verified by simulations using MATLAB/Simulink environment.

Ethical Clearance - Taken from ‘St. Peter’s Institute of Higher Education and Research

Source of Funding - Self

Conflict of Interest - NA

REFERENCES


12. N. K. Quang, N. T. Hieu and Q. P. Ha, “FPGA-


An Investigation of English Spelling Achievement among Second Level Saudi Students at King Khalid University

Mahassin Osman Mohmmed Gibreel¹, Sangita Babu²

¹Assistant Professor, Department of English, ²Assistant Professor, Department of Computer Science, King Khalid University, Kingdom of Saudi Arabia

ABSTRACT

Most of the Saudi college students’ face problems and difficulties when they try to spell English words correctly to create a piece of writing. The main objective of this study was to examine the spelling achievement in English among college students’ at KKU whose first language is Arabic. The interviewees consisted of 25-Thirdyear students. The instrument of this research has been based on a dictation task. The results showed that: about 243 spelling errors have been found in the subjects’ responses to the spelling test. The most frequent errors were: transposition with the lowest ratio 3 % of the total number of spelling errors, insertion with 17 % of the total number of spelling errors, substitution errors with 29% of total errors and omission with the highest level of the total number of spelling errors, 54% of errors . The results showed that the most common spelling error made by the learners in this study was to omit one or more letters (vowels and consonants) and the second highest type was to replace one or more letters in the test item with one or more incorrect letters.

Keywords: disabilities, substitution, omission

INTRODUCTORY PARAGRAPHS

In order to master literacy, one must not only be able to read and write, but to spell as well. Spelling is usually regarded as a fundamental element in learning English. Spelling ability is also regarded as a prerequisite to reading and writing development. To evaluate students’ acquisition in this area, most teachers would examine their achievement through vocabulary spelling. Spelling is “the encoding of linguistic forms into written forms” [21]. Two of the most important processes which spelling relies on are: phonological awareness and alphabetic knowledge.

Error analysis of spelling in languages with different orthographic depths has been the subject of a small number of studies. This type of analysis can help identify areas needing remediation in instruction. It can signal individual disabilities that could negatively affect a learner’s ability to read. Error analysis of spelling in languages with different orthographic depths in contexts where students are learning two languages can also provide insight into transfer and into how orthographic knowledge or knowledge about spelling in one language might be used in another language [10].

Learning to spell is important as it is intricately connected with learning to read. It can be a difficult task in the English language which, is made up of about 40 units of sound with only 26 letters used to represent them. When ESL/EFL learners are learning to spell in a second language in addition to their first, spelling can become even more complex.

Spelling is important for literacy because of its close relationship with reading and writing. Spelling supports reading because the two processes are reciprocally related and they both follow a similar course of acquisition. Furthermore, spelling supports writing. This is because “spelling and text production in later grades will require that students can automatically and legibly write alphabet letters and match sounds in words to associated spelling patterns” [22]. In addition, writers who must think too hard about how to spell use up valuable cognitive resources needed for the higher aspects of composition (Singer & Bashir, 2004, as cited in Moats, 2005).
Spelling also plays an important role in our daily lives. It is necessary in various occasions which range from undemanding tasks such as: filing alphabetically; looking up words in a phone book, dictionary, or thesaurus; writing notes that others can read; and even playing parlor games (Moats, 2005), to more complex tasks such as reading and writing. Spelling is also associated with competence.

Unfortunately, the spelling seems to cause a lot of confusion for all learners of English, including Arab learners. One of the most common errors that plague Arab students’ written work is spelling errors. Arab learners of English as other ESL/EFL learners find difficulty in their writing assignment and committed a lot of spelling errors. Consequently, they have difficulty in all English basic skills: listening, reading, speaking and writing. Their weakness in spelling achievement is as a result of their deficiency of the basic orthographical and morphological aspects which affect on all English skills.[18] Arab college learners find it difficult to acquire the phonological English system because it contains phonemic units differ about the alphabetical units. Also, this phonetic system which contains a lot of phonetic symbols and sounds isn’t present in their first language (Arabic). The previous reasons are the basic causes which lead Saudi college students to commit a lot of spelling mistakes.

Although spelling is crucial for second language users to write with accuracy, there is still a limited number of research on this matter (Cook, 1997). Undoubtedly, knowing and understanding the causes of misspellings is one technique to help improve Thai students’ spelling proficiency.

Statement of the Problem

Most of the EFL Saudi students face difficulties when they try to create a piece of writing. One of the main problems is spelling the English words correctly. Many students produce misspelled words, which result in disconnected sentences. Students face many difficulties when they write, especially in spelling. They cannot express their ideas, because they cannot spell words correctly. The researchers noted that there was a problem with the Arab students in writing and spelling in particular, where they had difficulties in spelling and pronunciation of the word, because of the difference between Arabic and English.

OBJECTIVES OF THE STUDY

The present research aims to achieve the following objectives:

To identify the types of errors encountered by Saudi EFL students, when they misspelled in writing.

To investigate the most common errors that students make in their writing.

Reconsidered the causes leading to the problem of misspelling, and to suggest solutions or treatments.

Research Questions

What are the most important types of errors encountered by Saudi EFL students, when they misspelled in writing?

What are the possible causes leading to the problem of misspelling among Saudi EFL students?

What are the suggested solutions to treat misspelling among Saudi EFL students?

Significance of the Study

This study is significant because it aims to communicate with KKU English language students directly to study their spelling errors to help them finally to overcome their writing difficulties. The significance of this study also comes from its attention to the spelling skill and its relation with listening and pronunciation skills. In other words, the researchers will shed light on all aspects which may be possible causes of the spelling errors to help students to write more effective essays. For teachers, this study is significant because the results will introduce the main sides of weaknesses among their students in spelling to help them in avoiding them.

LIMITATIONS OF THE STUDY

The current study is limited in using an error analysis one concerning spelling errors made by 25 female second year (level3) students. This study is limited to English students who attended King Khalid University in Rijal Alma- KSA in the first semester.

Hypothesis of the Study

It is hypothesized that misspelling among Saudi EFL students:

Are unavoidable in their writing tasks.
Students committed errors more frequently than others; in other words there is difficulty in spelling some words more than others.

Analysis of students’ spelling errors can help them finally to learn and concentrate on their weaknesses; consequently help them to avoid doing more mistakes and errors in the future when they acquire English language writing skill.

Teachers have a large effect in their students’ improvement in spelling tasks.

LITERATURE REVIEW

Many researchers have studied spelling problems and their causes to show their impact on improving English language skills. Many researchers emphasized on spelling as a language skill whereby sounds (phonemes) are represented by letters (graphemes), which constitute the smallest building blocks of written language. The structure and texture of written language begins with spelling. Most researchers, past and present, highlight the importance of spelling in writing.

[23] conducted a study aimed at investigating the phonological and orthographic problems that Saudi EFL students have in spelling English, their second language. With this aim in mind, the researcher asked 36 ESL students at the College of Languages and Translation, King Saud University, Riyadh, Saudi Arabia, to complete a listening spelling test which required them to fill out 100 blanks in a dialogue. The results showed that the participants exhibited serious spelling difficulty, especially at the phonological level that constituted 63% of the errors. Poor spellers had difficulty hearing and discriminating all or most of the phonemes in a word, hearing and discriminating vowel phonemes and hearing the final syllable or suffix. He also found that, as for orthographic problems, they included vowel digraphs, double consonants, silent vowels, consonants and homophones. Al-Jarf (2014) concluded that most of the participants’ weaknesses in spelling English can be attributed to the interference of the mother tongue. In other words, the participants were transferring the Arabic spelling system into English, which led to different spelling errors.

[25] found five types of spelling errors: (1) substitution (one or more letters are substituted with others, e.g., rabbit/ ribbet, present/prasent), (2) omission (one or more letters are missing from the target words, e.g. bigger/biget, August/Augst), (3) transposition (one or more letters are misplaced, e.g. minute/miunte, first/frist), (4) addition (extra letter is added to the target word, e.g. October/Octorber, pencil/pencial, bench/beanch), and (5) combination of the above. Each error type was further divided into two groups of consonant and vowel according to the place where errors occur. After the exploration of the errors, [25] pointed out three prominent features in the error of vowel substitution: first, errors often occur in non-stressed syllables; second, the substitute letter(s) and the target letter(s) are often pronounced the same or similarly; last, a target letter may be replaced by its phonetic symbol.

Next, a study conducted by [23]. They aimed to identify the frequency of spelling learning strategies that Arab EFL learners use to learn English spelling. Also, they aimed to explore the different kinds of errors that committed by these students in spelling. Their study sample consisted of 757 students from different educational levels in Oman. They designed a questionnaire, which was divided into different categories representing different spelling strategies. They found that: results revealed statistically significant differences in the use of the spelling strategies with respect to gender and achievement levels. Also, they found that Arab EFL learners committed different kinds of spelling errors when they write, but the most frequent error is the omission error.

Another study was conducted by [25]. He aimed to analyze of spelling errors by college EFL learners. He explored the errors in Chinese college and senior high school students’ English compositions. Both of them list spelling errors as one of the lexical errors and classify them by the following six causes: (1) formal similarity (e.g. communication/communitation), (2) overgeneration (e.g. basic/basical), (3) inherent difficulty in English spelling system (e.g. guidance/guidence), (4) inaccurate pronunciation (fresh/flesh, uncle/uncle), (5) lack of practice, and (6) a slip of the pen (errors in achievement due to negligence). They observe the
relationship between spelling and pronunciation as they find inaccurate pronunciation to be a cause for spelling errors. However, they do not explain much about the reason why some words tend to be mispronounced.

[17] aimed to study the role of the spell checker program in helping students in their spelling errors. Spelling checker is an electronic program that checks the spelling of words in a document. She found that a spell checker has undeniable drawbacks and may mitigate against language learning. It cannot detect the error when the writer produced a correct word when s/he misspelled the intended word (e.g., flow instead of follow, from instead of form, maid instead of a rest). Jones also pointed out that a spell checker may not give the correct word even if it recognized an error. She said that when a writer wrote *definantly instead of definitely, the spell checker may give defiantly. Jones showed that homophones such as rain, rein, reign would be difficult to understand if they were spelled the same way. A homograph such as wind (/wind/ - /waind/) can help in vocabulary learning since it is two words in one form.

[5] aimed to study and investigate the spelling errors made by Arab EFL learners we they do their writing tasks. Researcher designed a small experimental study by using writing test of intermediate high school Saudi students aged 17-18 years old. The results of this study showed that Arab EFL learners have different kinds of spelling errors when they write in English. The most common spelling errors are consonant doubling, silent letters, final [e] and vowels in general. It is, thus, indispensable for Arab instructors and stakeholders to scrutinize this dilemma explicitly. Alsaawi concluded that spelling errors made by Arab learners are associated with the impact of their L1.

[11] investigated the causes of the spelling errors that lead Arab students of English to misspellings. The sample of their study included 91 grade ten teachers in North Batinah and South Batinah governorates in Oman. The findings of her study revealed that the highly rated causes of the misspellings as perceived by the teachers were the complexity of the English spelling system, letter(s)’ combinations in English, poor reading proficiency, students’ carelessness, sounds that exist in English but not in Arabic and the fact that sound-letter correspondence in English is not regular.

[12] found that ESL/EFL learners are influenced by their particular mother tongues. For example, the languages that a character based script employ the visual route in its writing system whereas other languages such as Spanish and Arabic are alphabet-based scripts that follow the phonological route in their writing systems. According to Cook, a Chinese learner of English who has largely acquired language symbols for different Chinese words may therefore find it relatively easy to learn English spellings visually more that Arabic learners whose language based on the alphabetic scripts.

[12] further illustrated the distinction between different languages. He described Chinese as an orthographically deep language since it is a ‘meaning-based’ language. Conversely, languages such as Arabic are described as orthographically shallow. Thus, [12] concluded that ESL or EFL users from orthographically deep languages are expected to face spelling problems with words that employ sound to letter correspondences while users from orthographically shallow first languages such as Arab learners are expected to make spelling errors with words that are to be learned visually.

[6] in his descriptive study explained that the L1 of the learner causes serious difficulties if the two languages are ‘linguistically distant’ like English and Arabic. Specifically, an Arab learner of English will most probably look for sound-letter relationships since s/he is used to rely greatly on phonetic bases. Arabic is a sematic language with non-Roman alphabet. Its script is cursive and written from right to left. There are 28 letters in Arabic. Out of the 28 letters, there are 3 vowels, 15 letters that are dotted: 10 have one dot, 3 have two dots and 2 have three dots. The Arabic language does not have capital letters and does not use hyphens (Azzam, 1993).

Another aspect of the Arabic language that is seen to be a source of difficulty for Arab learners of English in spelling is the fact that some letters in English do not exist in Arabic. An example of these letters is (p) and (v).

Allaith;Joshi (2011) compared the performance of Arabic students in grade four and six with English students in spelling “cognate phoneme pairs which exist across both languages (/d/ and /t/), and pairs in which only one of the phonemes exists in Arabic (/b/ and /p/, /l/ and /v/) using a spelling test which contained words with the target phonemes. The researchers found out that both groups of students performed similarly in spelling
the phonemes /d/ and /t/; however, Arabic participants
tended to confuse the spelling of the words that contained
the phoneme /f/ and /v/ and /b/ and /p/.

In the light of the previous studies and conclusions,
the present study aimed to study, analyze and conclude
the main types of spelling errors made by Saudi college
students in English at King Khalid University as foreign
language students.

Importance of Spelling

The source of spelling importance as a language
skill comes from the fact that sounds (phonemes), are
represented by letters (graphemes) which, constitute
the smallest building blocks of written language. The
structure and texture of written language begin with
spelling. Most researchers, past and present, highlight
the importance of spelling in writing. Good spelling is
critical for literacy and it makes writing much easier by
allowing the writer to focus on the ideas to be conveyed,
not the letters needed to put those ideas on paper.

Incorrect spelling is a serious social error, making
a person; at least, illiterate if not outright ignorant,
misspelling frustrates and embarrasses the writer. It is
worth mentioning in this connection that some people
might downplay the role of spelling in writing believing
that an electronic spell checker can do the job.

Spelling Errors and Error Analysis

Spelling was defined as the act of forming words
correctly from individual letter. This means spelling
has its rules to form words correctly, that is, letters
must appear in the correct sequence to be meaningful;
otherwise it will lead to spelling errors. Spelling errors
can be either freely produced or elicited by certain tasks.
Any word that does not match the target word in part
or in full is marked as a misspelling. Any faulty word,
faulty grapheme (single vowel, single consonant, vowel
digraphs, consonants digraphs, phonogram, suffix, or
prefix) within a word is counted as a spelling error.
Thus, spelling errors affect the interpretation of a word in
the minds of the readers. Spelling errors cause problems
with communication since it is a deviation from rules or
norms.

Errors are defective parts in writing or it is the
composition that does not follow the rules of the target
language. The spelling error corpus is then divided into
the following groups: (i) whole word error; (ii) words
containing one error; (iii) words containing two errors;
(iv) word containing three errors; (v) words containing
four errors and so on. Spelling errors analysis revealed
and reflected the influence of the first language on the
learner’s target language achievement. As is shown
in the data analyzed in this paper, the learner’s first
language spelling rules can and often do get misapplied
by learners when it comes to turning phonemes into
graphemes in the target language, such as confusion
between (/b/) and (/p/) in the word (bottle). And finally,
spelling errors analysis may even provide clues as to the
cognitive state of learners, especially where there is a
need for specialist intervention (Al-Jarf, 2010).

Main Causes of Spelling Errors

Development Factors

One of the main causes of spelling errors is the
natural developmental factors. Many of the spelling
errors that learners of English commit stem from the
linguistic development stage, which conditions and what
learners are capable of producing. Such errors are out of
the hands of learners, as the language stage they are at
does not enable them to master certain language features.
Many of the spelling mistakes made by the learners were
very similar to those made by native speakers as part of
their developmental stages. For example, many of the
errors can be observed in baby talk, such as reversing
the order of two adjacent phonemes in some words, as
in spelling first as frist. Second language learners are
expected to overcome such errors as they move to higher
stages in language learning.

Irregularity of the English Spelling System

Main cause of spelling errors and one that seems
to cause most learners of English a big problem in
developing their spelling proficiency is the irregularity
of the English writing system. This irregularity
appears to confuse learners from different language
backgrounds, including native speakers. The main
cause of this irregularity is that: there is no one-to-
one correspondence between the written word and its
pronunciation (Bulushi & Seyabi, 2016).

There are four basic features of the English writing
system, which give it its notorious reputation of being
irregular. The first one is that different sounds are given
to the same letter or combination of letters, as in break
versus cream and gem versus get. The second cause is
that a single sound can be expressed by different letters or combinations of letters as in maid, made, say, and weigh. A third cause is that many English words contain silent letters as in debt, enough, light, tongue, and foreign. He also adds that the alternate spellings that many English words have, such as theatre-theater and color-colour, also cause some confusion to language learners. All these irregularities cause learners of English to find English spelling a big burden [21].

Mother Tongue Interference

The differences that exist between the mother tongue and the target language act as a hindrance to the process of learning a language. Those speakers whose mother tongue has more similarities to the target language are likely to find it easier to acquire than other speakers whose mother tongue is more distant linguistically. The influence that the mother tongue may have on L2 acquisition is the transfer or interference effect. This transfer or carryover of knowledge can be either positive or negative [13]. The native language can influence the acquisition of L2 in two ways. On the one hand, learners are likely to have problems acquiring L2 in particular areas where the mother tongue has no equivalents for some of the linguistic features found in the target language. For example, many Arab learners have difficulties pronouncing and spelling p and v because they do not exist in Arabic. On the other hand, where equivalents are found, learning is likely to be facilitated.

The Most Common Types of Spelling Errors

The most common types of spelling mistakes that were classified into different categories as follow: spelling words as they are pronounced (e.g. Wednesday as Wensday). Misspelling words because they have been mispronounced by the teacher or because the learner, due to his colloquial speech, mispronounces them (e.g. chimney as chimley) (Hashemi, 2016). Reversing pairs of letters in common words, as in reversing ie and ei in believe and receive. Using double letters for single letters (e.g. untillas until). Substituting a letter for another that has common visual features to it (e.g. goiny as going). Homonyms (bare as bear).

In spelling tests, some spellings were caused by partial or total ignorance of words which they were asked to spell. So students either got part of the word correct or wrote it totally wrong (e.g. geography as geograthathy). And not hearing or perceiving the word incorrectly in a spelling test (Morris, Blanton, Blanton, &Perney, 1995).

Factors that Influence Language Learners’ English Spelling

All the mistakes caused by the types of different spelling errors may be prevented by making the learners want to learn how to spell and by establishing in them the habit of testing the accuracy of all their spelling responses and correcting all their written work before handing it in. This would make them notice more accurately the form of the word not only when studying it for a spelling test, but when seen in print (Corder, 1981).

However, as for the different groups of mistakes they may be as a result for “phonetic spelling” and “ignorance of words.” These errors can be prevented by requiring the learners to make more accurate observations of the words to be learned while they are studying them, and by forming the habit of never guessing at the spelling of any word which they attempt to write. Difficult words should receive special attention (Morris, Blanton, Blanton, &Perney, 1995).

Word Recognition and Reading Fluency: The Spelling Connection

Reading and Spelling

Apparently, the linguistic differences that exist between Arabic and English cause many Arab language English learners to commit a lot of spelling errors, which in turn affect their overall writing proficiency. In general students’ performance, most usually do much better in speaking tests than on written ones. Their writing is rarely free from spelling errors. Some of these errors make their writing very difficult to read, which consequently affects their grades and writing proficiency development. Nevertheless, in addition to this negative influence on writing proficiency, many researchers also seem to believe that the linguistic differences that exist between Arabic and English seem to confuse Arab students and cause them to read slower than they should, which affects their overall comprehension and reading proficiency. Thus, they face different reading problems from the problems that other learners from other language backgrounds face. For example, Smith (1973) points out that “the more similar the writing systems of two languages are, the less time learners will need to develop basic encoding and decoding skills” (p. 125). Similarly, Bernhardt (1991) points out that language
with similar orthographic systems share similar reading experience that make reading easy.

[14] believed that the spelling problems that ALEs of English have because of the linguistic differences between Arabic and English makes many Arab learners face difficulties in developing their reading and writing skills compared to other learners from non-Arabic backgrounds whose languages share more similarities with English. As such, they believe that Arab learners “should not be expected to cope with reading and writing at the same level or pace as European students who are at the same level of proficiency in oral English” (p. 199).

**First Language English Word Recognition Fluency and Reading Skill**

Fluent reading involves direct eye-fixations on most words in a text, and in particular, a vast majority of semantic content words; consequently, the predominant reoccurring process in fluent reading involves word recognition and identification. Proficient readers have significantly faster and more accurate word recognition skills than age-matched poor readers. Spelling word recognition processes must function rapidly and efficiently so that attention and resources can be utilized for higher-level reading comprehension processes beyond the word-level which are necessary to extract semantic propositions, generate inferences, and build a coherent situation model or text base (Morrison, Blanton, Blanton & Perney, 1995).

**EFL Word Recognition Fluency and EFL Reading Skills**

Reading proficiency showed that the emergence of EFL spelling word recognition abilities involving phonological and orthographic decoding skills plays a major role in the EFL reading development, and that is in part independent of EFL oral language proficiency and general vocabulary knowledge. For example, skills like phonemic awareness and word naming speed account for nearly all of the variance of reading skills among young beginning-level EFL readers [19]. Even at higher levels of EFL reading proficiency, spelling word recognition skills are primary predictors of reading development. Spelling word recognition measures such as homophone judgment and orthographic legality judgment tasks explained a significant portion of reading comprehension variance beyond EFL syntactic knowledge, EFL vocabulary, and working memory capacity (Corder, 1981). Orthographic and phonological processing skills reliably differentiated the more skilled from the less skilled readers. An orthographic processing task accounted for more variance in the reading comprehension scores than a phonological processing task did, which suggested that more proficient EFL readers, like proficient L1 English readers, rely more on the use of visual orthographic information (i.e., spelling representations or orthographic codes) than phonological decoding processes and phonetic codes during word recognition [14].

**Efficacy of Spelling Instruction as a Solution of Reading Skill Weakness**

Many researchers have investigated the effectiveness of spelling instruction for developing students’ spelling proficiency. Many of these studies showed that spelling instruction has rewarding results.

For example, [19] described the results of a program that the School of Education of Miami University developed for diagnosing spelling problems and providing remedial instruction. He explained that the program mainly helped learners discover their weaknesses, analyze them, and provide them with techniques to overcome them. Results showed significant improvement in students spelling.

**Spelling Instruction Techniques**

Different learning contexts might need different instruction techniques, and thus teachers need to analyze the spelling errors of their students and design special exercises to respond to their systematic errors. However, literature is replete with suggestions on teaching spelling that teachers can consider when designing spelling activities. Teachers can encourage individuals to keep personal spelling books to record their spelling demons, in order to practice them individually. Also, teachers can build in their students the habit of proofreading their work before handing it.

Learners need to understand the meaning of the words that they are learning. They need to be interested in learning them. Therefore, prolonged lists of words that they have to learn would not be effective [4]. Also, reading is the main source for teaching spelling. In addition to silent reading that provides learners with good exposure to words and their meanings, he believes...
that loud reading is of a great asset to learners in learning spelling. He indicates that when learners read aloud they pay more attention to the structure of words, while in silent reading the foreparts of words are believed to be of more importance than the end parts, which are usually the main area of spelling errors.

Dividing the words into phonetic words and sight words may help to simplify some problematic words and sounds for learners when they spell. Phonetic words have a correspondence between their written form and pronunciation, such as *dog*, *degree*, and *triangle*. These words are easier to learn if students pronounce them correctly. However, sight words are the words that contain silent letters or irregular use of vowels, such as *sight* and *enough*. These words require learners to rely heavily on their visual memory to remember them (Bulushi & Seyabi, 2016). Teachers can play an important role in this area by teaching students to study the word they are trying to learn. If its letters correspond with its pronunciation, it does not need much practice. However, if there is irregular spelling in the word, they have to try to remember the strange spelling.

**METHODOLOGY**

**Introduction**

This paper aimed at exploring spelling errors produced by Saudi university students and examining why these types of mistakes occur in their writing. Gaining understanding on the causes or reasons why they make mistakes should facilitate the understanding of language teachers and enable them to cope with problems appropriately. This chapter begins by describing the subjects and the instrument of the study, and then it demonstrates the procedure and data collection from the subjects.

**The Participants and Subjects of the Study**

The population of this study is Saudi university students in the southern region, at the King Khalid University. The population is composed of EFL students of the second year (level3), in the first semester of the academic year 2017.

The participants of this study consists of 25 English language university students from King Khalid University –Rijal Alma in Saudi Arabia .The subjects were selected from second year (level3) that studying English as a foreign language. They form one group according to their class time. They all had studied English as a foreign language for the duration of seven years at basic level and secondary level. In the first year at the university they studied English as the requirement isn’t specialized course. All the students are homogeneous in terms of age, learning experience and level.

**The Tool of the Study**

While this study concentrates on problems of university students in English spelling, the researchers has found that English spelling test is the most appropriate tool for data collection. Its magnificence comes from the simple reason that an English spelling test practically students in a situation to recognize English sound and to write.

In the spelling test, which was prepared by the researcher, a list of words from different sources was used to determine the spelling level of the participants by testing their spelling accuracy. It consisted of 20 words with gradually increasing difficulty in terms of frequency, word length, and morphological complexity, and included elements that were likely to pose difficulty for students such as such as vowel and consonant digraphs, and silent letters. In addition, the list included regular and exception words. The spelling accuracy was measured and the spelling errors were analyzed. The measure was a paper and pen based dictation task which consisted of 20 words. The test was built especially for this study.

**Procedures of Data Collection**

In the spelling test, the test administrator read the first target word from the dictation task aloud once, and then read it aloud once again. The participants then wrote the word in the space provided on the answer sheet. The same procedure was repeated for the remaining words. The spelling test has taken about 15 minutes class session. Before the students started spelling test, the researcher made the necessary instructions.

The students were asked to take the spelling test seriously and they were also, told that the spelling test has both educational and linguistic aims. The participants were encouraged to write the word even if they were not sure of the correct spelling. Consistency across words was maintained in regards to tone and speed of delivery. Most of the student wrote what they heard from the
researchers. All the papers were collected back after the test was given to them.

DATA ANALYSIS

After the test session ended, the researchers collected the students’ answer sheet (test papers) and analyzed the spelling of the students in their written words to identify what kinds of errors they have committed in their writing. Spelling errors made during the English spelling task were categorized based on the types of errors made. The researcher classified students’ spelling errors according to Cook (1997), who categorized these error into four major types: omission (leaving letters out), substitution (replacing letters with incorrect ones), transposition (reversing the position of letters), and insertion/addition (including extra letters). Then, the percentage of each category was calculated to show their relative frequency.

RESULTS AND DATA ANALYSIS

Introduction

This section presents the results of the field work of the study. The tables below show the results of 25 second year (level 3) students from King Khalid University. They are shown through figures and percentages. The subjects were given the spelling test without any explanation of spelling rules, or exercises in English sounds. The subjects were given the spelling test without any explanation of spelling rules, or exercises in English sounds. This research aimed to answer the following questions:

What are the most important types of errors encountered by Saudi EFL students, when they misspelled in writing?

What are the possible causes leading to the problem of misspelling among Saudi EFL students?

What are the suggested solutions to treat misspelling among Saudi EFL students?

FINDINGS

Frequency of Different Types of Errors

The errors that learners made in the spelling tests are analyzed in Table (4.1) according to the four categories of errors: omission, substitution, transposition, and insertion/addition. An example of an error of each type found in the tests was also given.

<table>
<thead>
<tr>
<th>Type of error</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Example</th>
<th>Target word</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion</td>
<td>40</td>
<td>17%</td>
<td>develope</td>
<td>develop</td>
</tr>
<tr>
<td>Omission</td>
<td>132</td>
<td>54%</td>
<td>cros</td>
<td>cross</td>
</tr>
<tr>
<td>Substitution</td>
<td>62</td>
<td>26%</td>
<td>becouse</td>
<td>because</td>
</tr>
<tr>
<td>Transposition</td>
<td>9</td>
<td>3%</td>
<td>bottel</td>
<td>bottle</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>243</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (4.1) summarized the frequency with which the four types of errors occurred. There were 243 errors in total out of 500 words (25 students multiplied by 10 words). Therefore, 48.6% of all the words written in the tests were incorrect. Of these, Omission errors were by far the most common, accounting for almost 54% of the total number of spelling errors. Transposition errors were the least common, amounting to less than 3% of the total. These error types are discussed in more details below, along with some examples from the corpus.
Table (4.2): Specific Kinds of Spelling Errors

<table>
<thead>
<tr>
<th>Type of difficulty</th>
<th>No. of Errors</th>
<th>Percentage</th>
<th>Target word</th>
<th>Example of error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Phonetic Spelling (Homophones)</td>
<td>10</td>
<td>4%</td>
<td>Talk</td>
<td>Took</td>
</tr>
<tr>
<td>2- Right Letters Wrong Place</td>
<td>9</td>
<td>3%</td>
<td>Bottle</td>
<td>Bottel</td>
</tr>
<tr>
<td>3- Mistakes with Consonants</td>
<td>109</td>
<td>45%</td>
<td>Differentiate/p/ from /b/</td>
<td>Bottle</td>
</tr>
<tr>
<td>Doubled letters</td>
<td>32</td>
<td></td>
<td>Finally</td>
<td>Finaly</td>
</tr>
<tr>
<td>Silent letters</td>
<td>11</td>
<td></td>
<td>Knife</td>
<td>Nife</td>
</tr>
<tr>
<td>Total</td>
<td>213</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Specific Kinds of Errors

Table (4.2) analyzed the kinds of errors made by the learners in the spelling tests in more detail. It lists some specific difficulties which these learners seemed to have.

These figures show spelling errors related to vowels (missing, insertion and incorrect vowels) were problematic for the students, as 48% of total errors are introduced in this area. Missing vowels in the written words had the majority of errors related to the vowels with 56 errors. Regarding the errors related to the consonants, which had a percentage of 45%, the substitution between two similar sound letters had the highest contribution among the other difficulties with 36 errors recorded. Double letters and missing consonants were also problematic for many learners. Phonetic spelling (homophones) and right letters wrong place were not a major source of difficulty, they had percentages of 4% and 3% respectively.

DISCUSSION

Discussion of Results

The spelling errors analyzed in table (4.1) according to the four categories suggested by Cook (1999); the percentages in the tables above were based on total (25) students who committed at least one error in their performance. The types of errors committed by the largest numbers of learners were omission and substitution. These findings support what the literature says that omission and substitution errors are the most common types of spelling errors Arabic learners make, as what Bulushi and Seyabi (2016) who investigated found in their study and found the errors in Omani students’ writing. In this study, in omission type, students omit some letters from words, because they do not know the actual spelling of the words. This may tell us that less attention has been given to spelling in English courses. Students should carry out more activities or co-activities in their courses to improve their spelling words.

In table (4.2), some spellings were too irregular and some inversions of letters within the word made it hard to be specific about the exact nature of some errors. So, the researchers classified the errors into further types and sub-categories, each of them represent some problematic area for the students, to introduce them in more details and try to figure out the reasons of these errors. It was surprising how many mistakes occurred in short, familiar words, which might indicate that little attention is given to correct English spelling. Vowel mistakes featured in 48% of the words (117/243) with consonant mistakes in 45% (109/243).

The main patterns of errors with vowels can be seen in chart 2. Interestingly, of the 117 words with vowel mistakes, 56 (48%) had missed vowels, 34 (29%) words with additional vowel letters, and 17 (23%) words with writing incorrect vowel letters.

![Figure (5.1): Percentages of Specific Kinds of Spelling Errors, Appendix A](image-url)
The problems that learners had with homophones here reflected a similar challenge, as the sound of the word on its own does not indicate which of two or more possible spellings is required. To correctly spell homophones, learners also needed to understand the sentences in which the word occurred in the test.

The substitution between letters has similar sounds accounted for only 36 of the 243 mistaken words. Spellings such as confugen (confusion) and Photografy (Photography) successfully suggest the target word. The main cause of substitution errors is the lack of knowledge of the relationship between sounds and written symbols and faulty pronunciation. Students who spelled phonetically need to learn the correct visual correspondence to sounds. At times, they may over-generalize other patterns which produce similar sounds, as in resive for (receive). Learners’ difficulties with certain sounds, such as /k/, are further evidence of the challenge the lack of sound-spelling correspondence in English presents. Double letters were another source of difficulty, as English pronunciation often does not indicate that a letter occurs twice.

One significant problematic area has appeared in the students’ responses which is called ‘Right Letters Wrong Place’. As the term suggests, every letter is correct, but with inaccurate placement. The most likely explanation of this is that learners take visual ‘snapshots’ of words, but when it comes to recall, the phonetic information necessary to position the letters correctly is lacking. Of the 486 words, only 9 (3%) fell into this category. Such errors are characteristic of the partial alphabetic stage because of the presence of the correct letters, but not sufficiently controlled for the full alphabetic stage. The error analysis in the current study showed that whole words are rarely inverted but only pairs of letters.

Silent letters were clearly a major source of difficulty as well. This is not surprising given that there is no sound-letter correspondence for silent letters. Knowing how to spell words with silent letters means to be able to memorize them and to recall them from memory when they are needed in writing. Over 11 errors have been committed by the subjects in this study which indicates that they had problems of this kind.

Causes of Errors

With respect to the data obtained from the students’ inaccuracy of spelling, two main causes leading to misspellings were found. Two main areas of difficulty face Saudi EFL student: differences between English and Arabic writing systems and limited knowledge of orthography or spelling.

Differences between English and Arabic Writing Systems

It is obvious that Arabic orthography differs completely from that of English; therefore, interference errors take place when the patterns of the first language differ from those of the second language. The learner fails to recognize the sound and select the wrong symbol to represent it, for example, (professional→ Professional).

Likewise, the learner cannot distinguish between sounds because the second language contains phonemes, which do not occur in the first language (Arabic) for example, the double consonant in (adres→ address) and
Limited Knowledge of Orthography or Spelling

The orthographic system of English itself is a great problem that faces EFL learners particularly in the graphical representation of the vowel sounds and some consonants sounds. Some of sounds have such a variety of letters and digraphs to represent them that the student is sometimes at a loss which one to choose. Saudi ESL students also have many difficulties with English vowels because Arabic and English have two different vowel systems. They have difficulty in producing /i/ as a different vowel from /e/, e.g. (meddle → middle) and (defferent → different).

The other type of letter reversals, omission, and insertion may be a result of their limited knowledge of spelling.

The first type of mistakes found in letter reversals as in (Recive → Receive), (baord → board) and (Develope → Develop) Knowledge of vocabulary is significant especially when learners have to cope with correct spelling of homophones. This wrong production reflects the phonological problems of words with the same sounds and a lack of lexical knowledge.

In short, these findings apparently support the view that orthographical knowledge is essential in learning spelling, and they support the fact that spelling skills require a lot of attention and effort in order to make correct spellings.

Conclusions and Recommendations

After the researcher has discussed the major findings of this study, she will conclude the paper and provide some overall comments and recommendations.

CONCLUSION

Spelling is a complex cognitive activity in which many interrelated skills are involved. Mastering the English spelling system means to learn the correct association between the English phonemes and written graphemes. The fact that English spelling is more complex than that of Arabic, it is expected to pose several spelling difficulties for Arab students particularly in the early stages of spelling development. The purpose of the current study was to investigate the types of spelling inaccuracy produced by second year (level3) Saudi university students and to examine the causes of misspellings found in their task responses.

This analysis was conducted in an attempt to clarify the error patterns of L1 Arabic learners of English. About 243 spelling errors were found in the subjects’ responses to the spelling test. Generally speaking, omission and substitution errors emerged here as the most common types of spelling error. That is, the most common spelling error made by the learners in this study was to omit one or more letters (vowels and consonants) in a certain word and the second highest type was to replace one or more letters in the test item with one or more incorrect letters.

Looking more specifically at the kinds of errors the learners made, errors related to vowels (omitting, insertion and incorrect using) was found to be the most common. Some other difficulties were provided such as homophones, right letters wrong place and errors related to consonants, which were further classified to: sounds, doubled letters, silent letters, extra consonants, missing consonants. Many reasons have been discussed, but lack of explicit teaching of spelling faulty knowledge or to temporary slips appear to be a prime cause. Learning to spell is something all our learners need to do. As a result of this study the researchers is now more aware of the kinds of spelling errors that level3 EFL students at King Khalid University are likely to make.

Learning to spell is something all our learners need to do. As a result of this study the researcher is now more aware of the kinds of spelling errors that level3 ESL students at King Khalid University are likely to make. The author hopes that teachers who read this work will feel that it also gives them some ideas about how they might learn about the spelling difficulties of their own learners of English.

Suggestions and Recommendations

The statistics of this study regarding the four basic types of errors are again in agreement with previous studies. The researchers noticed that students do not know the actual sound system of English, so they use the wrong letters. The researchers suggest some of the points that support teachers to help their students to b good at spelling:
1- Explain the rules of spelling to students.
2- Drill and practice on spelling rules, such as suffixes, prefixes.
3- Students should receive more practice listening skill.
4- Encourage students to visualize words and syllables.
5- Use dictionary and word processors will help students in spelling of words.
6- Teach students phonics and spelling in the English language to reduce the influence of Arabic spelling of English.
7- Develop spelling course consists of (basics of spelling) and integrated it in English courses, listening, reading, writing, speaking and vocabulary,
8- Encourage students to read more, the more they read, the more they will see how different words spelled and used in context.
9- Teach students the commonly misspelled words, such as (there, their, its, its, to, too…. Etc)
10- Tell students to say and spell the words aloud.

With these strategies, the researchers hope that errors are bound to decrease.

**Ethical Clearance**- King Khalid University, Kingdom of Saudi Arabia

**Source of Funding**- Self

**Conflict of Interest** - Nil

**REFERENCES**

18. vocabulary SpellingCity. Retrieved 1 December 2017,


PFB+- Tree For Big Data Memory Management System

K Santhi¹, T Chellatamilan T², B Valarmathi³

¹Associate Professor, Department of Analytics, School of Computer Science and Engineering (SCOPE), VIT University, Vellore, India, ²Professor & HoD, Department of Computer Science and Engineering, Arunai Engineering College, Velu Nagar, Thiruvannamalai, India, ³Associate Professor & HoD, Department of Software Systems, School of Information Technology and Engineering (SITE), VIT University, Vellore, India

ABSTRACT

Decades of research and experiences on organizing the large databases and contemporary world’s resilient interests in gigantic data, information transferred various indexing techniques to a new level. From all-encompassing experiments, the PFB+-tree has exhibited its excellent prospective for big data in-memory management system. The PFB+-tree does quick indexing structure by utilizing range searches, point searches and multi-level key ranges are quickened by prior pruning of searches to get distrait data. The depth-first or breath-first searching methods are used for range searches. One consortium of various searches can be set upwards with only single pass on indexing structure to reduce the time complexity. The LSB+-tree can speed up queries directed to the most accessed ranges of indices. Extended experiments are presented to show and high efficiency, particularly for testing its adaptability and performance for big data storage management.

Keywords: Big Data, Breath-first, Depth-first, PFB+-tree, Query Performance, Indexing Access Method

INTRODUCTION

Primary Memory is getting greater and several terabytes of random access memory or more are common in modern high end servers, large-scale systems like twitter, Facebook can keep enormous measure of information across large number of server nodes to achieve gigantic aggregated memory system[1][2]. There is a lot of work done for in-memory data management and processing [3-6], however new needs and more advanced [4-5] hardware have been driving for new improved approaches to support faster data[6-9] accesses, for ever-growing data and real-time analytics [7-10].

Large data management[11][12] has higher requirement on access methods, [13][16] where index plays a big role. Even though in-memory[14-16] data access in much faster than disk access, when it comes with large volume of data, large number of queries, frequent updates, and real-time analytics, an efficient index can make a big difference, compared with solely relying on memory-intensive scan. However, traditional indexes were designed for disk-based database with tight memory restriction. The most greater ones incorporate Indexed Sequential Access Method (ISAM), B-trees, R-trees, B+ tree and FB+ tree, which are the fundamental tree organization structures[17-18] for databases. In fact, many practical and innovative indexing methods utilize B+ tree as subsidiary index organization, then a considerable amount of effort was practiced to reduce the time complexity[19-20] of B+ tree, even so there is nevertheless room for further profit, particularly when bigger memory is available or applications need to utilize memory and cache access speed to match its performance demand[21-22].

RELATED WORK

Because of main memory’s substantial speed advantage over the disk, many main memory’s indexes have been designed. It’s been hypothesized [24-25] that the plummeting costs of main memory [23] will make this design choice increasingly popular, at this point in time, in retail, 1 terabyte hard drives are selling for about the price of 2 gigabytes of main memory, making main memory[26] roughly 500 times as expensive. Aside from the still relatively much higher prices, the limited space of main memory makes indexing more complicated. What happens if the index grows too large? Another
drawback of the main memory approach lies in main memory’s volatility in the event of power failure, all information will be lost. A scheme for backing up the index regularly must be devised to prevent having to rebuild the index from scratch. These minor inconveniences are generally negligible when compared to the speed increase.

Lehman notes that one common way for a database organization to take benefit of more main memory is to simply increase the size of its buffer pool. After all, a larger buffer means fewer disk reads. Much research has been done, however, on smarter indexes that are meant to work well in main memory. The primary goal of such indexes is not to minimise disk reads, but rather to minimize cache misses which is of fast memory between the processor and the main memory. In these types of indexes, having to fetch data from main memory is the most expensive operation.

[B+ Tree] It is a multi-way search tree, meaning that each node in the tree can have many keys and many children. Every B+ tree has a characteristic called the order that determines the number of keys and children any one node can have. Consider if ‘o’ is the order of a tree and n is considered as the actual amount of children of a particular node, then we can say o/2 ≤ n ≤ o. This applies to all nodes in the tree except for the root, which may have fewer than o/2 children. It can grow dynamically and provide quite good performance for both point or range queries. Its actual keys are only stored in the bottommost nodes, called leaves at the keys in the upper parts of the tree are only there to guide the search along to the leaves. One advantage of this structure is that if a single key is erased from the B+ tree, it just has to be withdrawn from the leaf, not somewhere else in the tree. The keys in the upper parts of the tree will change gradually. All the leaf nodes are linked together sequentially in the form of a list.

[T- Tree] The T-tree was one of the very first indexing structures intended solely for use in main memory. Structurally, the tree is a cross between B-tree and AVL tree, T-tree is binary by which each of the node can have at most two children. However, the T-tree can hold many keys per node, as in the B-tree. This best of both worlds approach seemed to perform well in an experimental study. The T-tree outperformed both the B-tree and AVL trees in most tests.

The Cache Sensitive B+ -tree (CSB+-tree) is considered as a good example as the main memory variant of the B+-tree that is designed to have high cache utilization. To utilize the cache line most effectively, as many keys as possible are fit into one node. This minimizes wasted space and maximizes cache hits. Their approach to increasing the number of keys per node was to eliminate unnecessary pointers.

FB+-tree, which is projected to make requesting to fit in primary memory, and to perform fundamental search operations quick. A lookup operation for unavailable data will prune when the objective key is originate to not fit inside any level of key boundaries. If the expected object is available in range keyof the cache node levels, the search drive to the following level which doesn’t require to track the leaf-node linking in the B+-tree to acquire sibling pointers. The range search operations could be handled through “one badge” on the FB+-tree organization. In order to acquire a last coordinated list of leaf node addresses for a multipart query, check out all key ranges. The F2B+- tree in which subset(s) of key reaches are expressly chosen to make a partial FB+- tree. It might be modified for an specific client, custom-fit for a gathering of clients, pre-intended for a particular sort of utilization, arranged for one specific information bunch. The F3B+-tree, which is an additional change of FB+-tree organization. It figures out which leaf nodes of the B+-tree are employes often in lookup operations. The search operations are first performed in “popularity cache nodes”, where substitute routes to prominent leaf nodes are kept. If the question being looked up for isn’t in the scope of the store nodes, the search operation is kept after the regular FB+- tree store nodes, or if important, B+- tree nodes.

To design a good data in-memory data structure, we need to anticipate query processing speed, data structure updating speed, and also the flexibility to handle data overflow, in view of the inevitable gap between the rapid data growth in this big data era and the still limitedly increasing memory size.

PFB+ tree

PFB+ tree: The PFB+tree can be effortlessly worked by suggesting a FB+-tree organization to become multi-level key reaches. It stays in primary memory. The PFB+-tree contains information structures called cache records. Each cache entry is considered as a
spotlight and the cache entry has a pointer representation to its next level or a B+-tree leaf node on the off chance which is at the bottom level of the cache. Each cache entry characterizes and relates to a root node of a B+-tree organization.

Throughout search, the PFB+-tree behaves a similar purpose as the interior stages of the B+-tree; The search process for the parent node occurs from left to right, which is also the priority order, as the node with the highest access percentage is always set to the left. Nevertheless it allows us a peculiar feature that B+-tree cannot provide an exact and strong key margins of any branch, early pruning of searches, different methods of range search, and limiting input and output cost of group searches.

Structure of PFB+-tree:

The PFB+-tree comprises of lots cache nodes, which inturn comprise of cache records. Cache nodes must be regarded as “virtual” nodes as they are not the equivalent as B+-tree nodes and pages, that are minimized for the purpose of disk storage and access. A cache node encompasses:

(1) Information of the quantity of cache records in that (2) Frequency of node access, (3) Percentage of guest access to determine switching, and (4) Address of the next node in the percentage sequence.

A cache record of the PFB+-tree stands for a subdivision of the B+-tree. Each entry controls the lower limit and extreme keys of the subdivision, the “branch boundaries”. The cache entry on the higher side of the PFB+-tree stands for the whole B+-tree – the total indexed key boundary. The lowest division of the B+-tree is the leaf node.

In Implementing, the PFB+-tree is an in-memory structure, in order that cache nodes are often flexible. At this point are some alternatives to structure the cache. In figure 1, Option (a), PFB+-tree uses straightforward arrays for each layer of cache nodes, that is worthy for the applications within the case of having little or no data insertions, or no node splitting during the lifetime of the PFB+-tree in main memory. Option (b), using linked arrays, one for every cache node. Option (c), every cache node uses a list of smaller arrays. Option (d), is an extreme case of (c), when an array has one element, a cache entry. In alternative words, every cache node is a linked list of cache entries. This selection would possibly cause the flexibility, however require more space to keep the pointers. When storage is not an issue, this can be a sound means that to structure the PFB+-tree.

A cache entry that encompasses data on 1) its branch range 2) a pointer to its next level cache node within the PFB+-tree, or the B+-tree leaf node if at the bottom level, or its matching internal node back within the B+-tree in the case of building a “shortened” PFB+-tree structure, 3) for the cache node organization which is described in option (c), each cache entry furthermore uses a pointer pointing to its subsequent cache entry in the same cache node, 4) further data used for facilitate optimization.

Figure 1: PFB+ tree Structure

PFB+-tree search:

With the help of PFB+-tree-point search is very fast. It goes initially, the cache entry at the top then contracts down to finer indexing, by covering the nodes at the same level (Left node has the highest probability/percentage) from left to right. The parameter ranges level by level, based on the percentages, if the lookup key is inside a key limit. Figure 2 presents an illustration of a search that leads to leaf node of the B+-tree. No root or any other internal node of the B+-tree is required during the search. The PFB+-tree search can end early if it decides that a key which does not exist. Figure 3 is an example of a point search by using a key outside index parameter range(s) at some level of PFB+-tree. As soon as possible, the search ends prior to ever passing away to the next point and by no means get to the leaf node level of the B+-tree. The searching cost for non-existing keys make great sense for complex queries having multiple basic searches with a heap of fake keys is minimum.
With the FB+-tree, searches over range can also be treated very promptly. Mostly a search for range starts with a point search by using its lower boundary, then it is useful to adjust it whenever possible, in accordance with the real valid key ranges in index parameters. For an instance, assume a search range (99, 259), which is against two close key ranges (10, 90) and (100, 202) at some level in the FB+-tree. Now the lower search bound 99 could be renewed as 100, since there is no valid key between 91 and 99.91 and 99. Upper limit can also be renewed based on a valid key range in index parameters to keep the search cost of trying to determine whether the next neighbouring range of key or sibling leaf node is moved.

Figure 2: A PFB+ tree Search to a leaf node
Like point searches, when the key range of a range search is outside of (all) index parameter range(s) at some level, the search ends right away. Start as a key using the lower bound, renew the search key range whenever needed; unless the key range can be found invalid early, the search will further go on to get the first leaf node address based on the (updated) lower bound based off the percentage of access. Just continuing the search by accessing following leaf node(s) in sequence (Left to Right) at the same level of the PFB+-tree.

Figure 3. The end search of PFB+ tree before reaching the leaf node

Pseudocode: Creation of tree:
1) Get the root nodes along with the child nodes
2) Create the cache record for each node
3) Store it in the form of a listed array where each array has a virtual node that points to the next array in sequence.
4) The sequence based on the percentage of access/ counters for each node beneath the current layer. The percentage is arranged in descending order (i.e) Higher percentages to the left
5) The same is followed for every child node underneath
6) If the list of arrays has been parsed till the last leaf, (i.e) it has no further nodes , the creation for that Sub-Tree terminates

Searching for a point in the PFB+ Tree:
1)The search starts from the root in search of the correct parent, based on the percentage arrangement followed by the Tree (i.e) from left to right
2)If the correct parent has been found then the search repeats for the sub-Tree under that parent. This continues till the required leaf is found.
3)If the required leaf is not found , the tree is terminated with a negative response.
4)If the required node is found then the virtual counters of all the parent nodes and the correct leaf is incremented by one. And the virtual percentages are recalculated based on the new updates as:
   \[
   \text{Percentage} = \frac{\text{Sum of all counters under the node}}{\text{Total no of nodes in the same level}}
   \]
5)If at any instance, If the percentages of the nodes were updated, then the lists of nodes are rearranged in the descending order of percentages.
6)End of search with a positive response if the required leaf is found

Pseudocode: PFB+ Tree
1)Define a sample dictionary (ie the tree in form of nested dictionaries) in the format
Hence, we get a sequence of alternating outer and inner dictionaries forming a binary tree like pattern

(2) Create an empty list/array to store the tree path traversal/order.

3) Get input V, i.e., the value to be searched.

4) Call the run function and pass D,V,L as arguments.

5) Run function:
   a) Call the getp(D) function and assign the value to p1. Getp function takes a Dictionary as an input, processes it and returns a list of tuples containing the percentage, frequency and the key in order.
      i) Getp function
         ii) Get a list of all the values present in the given dictionary, i.e., these are the inner dictionaries in that format. That is, it’s a list of dictionaries.
         iii) Create empty list p1 to store ordered tuples
         iv) Get the tuple of keys of the variable using a simple user defined getkey function.
         v) Traverse the list of tuple of keys and append tuples containing the corresponding percentage, frequency and key.
   b) Call the user defined inchk() function and pass p1,V,D as arguments. Assign their values to chk1 and chk2.
      i) Create a deep copy of the percentage list p1 as p2.
      ii) Sort the list on the basis of percentage in descending order.
      iii) Traverse and process p2 with i as variable. Hence, i will be a tuple in the form (<percentage>,<frequency>,<key/range>).
      iv) Read the range r from i as, r = i[2]. i.e., r is a range in the format (<lower limit>,<upper limit>).
      v) Check range for leaf type (i.e., length of range tuple will be 1 if it’s a leaf) and check for the correct value that is to be found. If all conditions are satisfied, return the range and percentage list.
      vi) If it’s not of the leaf type then, check if the value to be searched lies between the lower and upper limits of the range.
      vii) If it lies within the range, perform operations to insert and update the percentage, frequency and range. And remove the old tuple consisting of old values.
   c) If it doesn’t satisfy return None, None
   d) Else check the length of chk1, if its 1 (i.e., it’s a leaf node), print (Item found) and print the array containing all the parent and child nodes.
   e) If length of chk1 is not equal to 1, then traverse D using l and if l==chk1 (i.e., the inner dictionary is the same as the hit dictionary) then, append the range to the array and rerun the main run function with the new hit inner dictionary’s val as argument (recursive and looping algorithm).
   f) Hence the algorithm repeats itself over and over again until the leaf node is found.

Testing on big data

The experiment shows how well the PFB+ - tree can work for big data. The datasets chosen contain 16M, 8M, 4M and 2M records following the uniform distribution. The query input is generated by Zipf (power law) distribution p(i) = C/l α, where C is the normalization function. The α (alpha) values are 0, 0.5, 0.6, 0.7, 0.8, 0.9 and 1. When α equals to 0, the output follows uniform distribution. The average I/O numbers and throughput are collected in the experiment.

Figure 4 shows the throughput (the number of queries per second) conducted regular_FB+ and PFB+ search. There is certainly much higher average throughput for PFB+ search on every data set, with even more advantage when α (alpha) is bigger.

![Figure 4. Throughput via search](image-url)
on IO cost with big numbers of data.

![Average I/O comparison with Buffer Size](image)

**Figure 5. Average I/O comparison with Buffer Size**

The outcomes in Figures 4 and 5 demonstrate that the greater part of the organization are performing well because of the expanded page size. With the proper arrangement of frequent queries and suitable tree configuration, the capability of PFB+-tree is in regular carrying out searches without moving to disk is quite impressive. Comparing with FB+-tree and regular B+-tree, PFB+-tree outperforms.

**CONCLUSION**

Indexing techniques are always being helpful to access data swiftly, thus in the field of bigdata analytics, the lists of nodes are rearranged in the descending order of percentages. The article presents a general flexible in-memory indexing technique supported multi-level key ranges, which might be simply implemented in the prevailing systems with B+-tree. Rather using the regular B+-trees, PFB+-tree is simple to implement everything. Not merely will it special and efficiently support basic searches, it will be simply adapted to accommodate memory limitation. The PFB+-tree is thus flexible that it will be narrowed to fit small memory and will create the indexing smarter. Our experiments prove it will be effectively used for big data as an in-memory structure. The improvement in database performance is high by using this structure regarding many contexts.

**Ethical Clearance**- VIT University, Vellore

**Source of Funding**- Self

**Conflict of Interest** - Nil

**REFERENCES**


A Bipolar-Pulse Voltage Method For Junction Temperature Measurement of Sporadic Current LED

K Thanigai Arul
Assistant Professor, Department of Physics, AMET University, Chennai

ABSTRACT

For measuring junction temperature of alternating current light emitting diodes a new method is introduced. New method employs a periodic bipolar voltage pulse signal as input, and utilizes amplitude of corresponding output current as temperature sensitive parameter (TSP), of which linear temperature dependence is proven in a prior experiment. Basis of TSP a device detailed procedure is adopted; First measure thermal resistance of package of ac LED’s which further contributes to calculation of junction temperatures under various power inputs. Comparisons between values calculated by using method and those obtained directly from a thermocouple indicate a decent accuracy of former. The proposed system can be quickly assembled with few extra costs, since all components are common in laboratories of electronic institutes. For obtaining junction temperature by measuring electric and optical powers advantages of a specific method benefits from stability of thermal resistance under different driving conditions

Keywords: Alternating-current light-emitting diode (ac-LED), junction temperature measurement, pulse voltage signal

INTRODUCTION

As first dozen years twenty-first century witnessed significant improvement in device efficiency [1], [2] technique of optical semiconductor devices has also experienced a rapid progress. Improvement of internal quantum efficiency has played a key role in the light-emitting diodes (LEDs) development. Specifically, by using large overlap quantum well concept or new active material concept [3–5]. [6] Internal quantum efficiency of the InGaN LEDs has been improved. Studies on structural, optical and spectral properties of Europium oxide doped phosphate glasses presented utility of technology has greatly mitigated electron-hole separation caused by internal polarization field. Optic-International Journal for Light and Electron Optics describes efforts which were jointly made by LEDs, a competent light source compared to the traditional lamps. As the technique of solid-state lighting enters field of general lighting, LEDs are gradually replacing traditional lamps. As the technique of solid-state lighting enters field of general lighting, LEDs are gradually replacing traditional lamps. Various types of packages have emerged to meet requirement in power output, colour qualities, and volume of lamps, which are being elevated every year [7][8]. Among those types of packages, alternating-current LED (ac-LEDs), as suggested by its name, can be directly driven by ac sources, e.g., mains, rather than by direct-current (dc) source. In consequence, ac-LED avoids adopting complicated ac-to-dc convert circuits as dc LEDs.

Three different circuits exists that share an identical core—arrays of microchips in series, through which total voltage drop is distributed equally to each microchip in array to ensure safety, as long as every fraction of voltage drop is no higher than break-down voltage [10]. A problem is raised that heat power generated from chip is equally strong compared with dc-LED, despite a far lower mean current (10–100 mA) than that of dc-LEDs (∼350 mA). Its delicate structure and tiny sizes of microchips make chip of ac-LEDs more vulnerable to high temperature. A good thermal management is highly necessary, and determining junction temperature is of paramount importance. Methodology of junction temperature of dc-LEDs has been of great maturity. There have been several methods based on various temperature-sensitive parameters (TSPs), which can be forward voltage in tomography seismic inversion of a paleochannel system, reverse current [12], current under voltage threshold [13], or centre of mass wavelength of spectrum Bearing a resemblance to dc-LED, a
proper temperature sensitive parameter (TSP) as a key to measuring the junction temperature for ac-LEDs should be at the same time easy to capture and of high accuracy which 3-D tomography seismic inversion of a paleochannel system in central New South Wales \cite{11} presented the literatures. It is usually challenging to find one method that fulfils these requirements due to unsteady driving condition. In literatures, several methods have been reported \cite{14}, In \cite{9} Studies on structural, optical and spectral properties of Europium oxide doped phosphate glasses correlated Tj and board temperature (Tb) of an ac-LED described different input power levels at dc operating conditions. Junction temperature of AlGaInP LED arrays is based on shift of centre wavelength at full width at half maximum. Chen and Narendran estimated junction temperature of AlGaInP LED arrays based on the shift of centre wavelength at full width at half maximum. Researchers till date have not devised an effective solution of high accuracy for measuring ac-LED junction temperature.

A new solution for measuring the junction temperature of ac-LEDs has been introduced. Linear temperature dependence of current amplitude for determining the thermal resistance of the package can be subjected using ac-LED samples under voltage pulses. There is temperature difference between junction and heat sink at a certain thermal power, which lead to thermal resistance of the package with current amplitude functioning as TSP. Junction temperatures at any conditions could be calculated readily. A procedure is presented in detail, and results are listed as well. Comparisons with results obtained from thermal couple prove a decent accuracy new method. A microcontroller based design methodology of an automatic solar tracker is presented. Light dependent resistors are used as sensors of the solar tracker. Designed tracker has precise control mechanism which will provide three ways of controlling system. A small prototype of solar tracking system is also constructed to implement the design methodology presented here \cite{10}.

**THERMAL RESISTANCE AND JUNCTION TEMPERATURE**

The thermal resistance is a key factor of the thermal management. For cases of LEDs, no matter driven by dc or ac sources, chips produce heat while emitting light, therefore, sever as a heat power source at a raised temperature Tj. Heat should be conducted through copper layers beneath chips to heat sink, which is maintained at a constant temperature Th. According to second law of thermodynamics, Tj should be always higher than Th to ensure a heat flow from chips to heat sink. As shown in below equation, thermal resistance is defined as Rth as ratio between chip-heat sink temperature difference and thermal power, which bears a strong resemblance to Ohm’s law in electric circuit.

\[
R_{th} = \frac{T_j - T_h}{P_{th}} = \frac{T_j - T_h}{P_e - P_{opt}}.
\]

In practice, heat flow power can be calculated by subtracting optical power (Popt) from electric power (Pe). Similar with its electric counterpart Rth is determined by nature of package, independent of heat flow power. Stability of Rth will greatly facilitate junction temperature measurement, since Rth obtained in one case applies universally to various driving conditions in which driving powers can be significantly different, and leads to correct Tj under these conditions, respectively.

**EXPERIMENTS AND RESULTS**

**Introduction to System Configuration and Samples**

A measuring system that adopts a pulse signal generator for determining the thermal resistance and junction temperature based on the discussion the devise has been adopted. The whole configuration is sketched in Fig. 1. Samples are mounted on a temperature-controlled heat sink (LED620, Instrument System Corp., Germany), and optical parameters are captured by an integrating sphere and spectrometer (ISP150 and Spectro320, Instrument System Corp., Germany). Signal generator (AFG3021, Tektronix, America) serves as the voltage source. Voltage signal is amplified by a linear amplifier (1511DLA087 dana power supplies, Italy). Results are shown in digital oscilloscope (ZDS2022, ZLG, China) which is captured through Electric power (WT310 digital power meter, YOKOGAWA, Japan) directly in experiment. System can be quickly assembled with few extra costs, since all components are common in laboratories of electronic institutes.
Choosing square wave signal to drive the samples, and measure the current amplitude which can be considered as a candidate of TSP these peculiar natures of ac-LEDs are followed. As illustrated in Fig. 2, signal waveform is positive at first half period and negative at next. Particular kind of signal is not applicable for dc-LEDs since it contains reverse-biased voltages that may cause breakdown. Compared with forward current, leakage current induced by reverse-biased voltage is several orders of magnitude smaller, and its physical property is quite different. Amplitude and frequency of voltage signal at 100 V and 50 Hz, respectively, but change $T_h$, and monitor the shift of current amplitude ($I_p$) is maintained. It is reported in literatures that heat power can be neglected when pulse width is less than 20 µs, and thus results in little temperature deviation between junction and heat sink \[11\]. With this fact in mind, pulses are limited by width to 12 µs, raising heat sink temperature from 29.6 °C to 92.7 °C, and that measures $I_p$ at a series of temperatures. Result indicates a strong linear dependence, which can be described in form of $T_j = k \times I_p + C$.

For this very sample, $k = 4.3289$, $C = -15.563$, and R-squire= 0.9973. In addition, $I_p$ can be replaced with mean value of $I_p$ of several periods to enhance accuracy. These two advantages make $I_p$ a perfect TSP for ac-LEDs.

**Procedure of Junction Temperature Measurement**

As discussed in previous section, first quantify $R_{th}$ of the sample via $I_p$ as TSP, and then calculate $T_j$ in several driving conditions. Thermal Resistance Measurement (Fig. 2): As indicated in (1), one needs to quantify $P_e$ and $P_{opt}$ of the chip as well as $T_j$ and $T_h$, before getting $R_{th}$. After mounting samples on heat sink of the temperature set at $T_h$, $P_{opt}$ and $P_e$ directly can be captured directly. Note that instead of sinusoidal signal, a signal with constant amplitude over an entire period would greatly facilitate calculation. With this in mind duty cycles of the bipolar voltage rectangular wave to 100%, making constant voltage amplitudes $V_{p0}$ of 100 and −100 V, respectively, for the first and second half-periods [Fig. 2].

**Fig. 2. Sequence diagram of measuring the thermal resistance.**

**Step I**: Sample to a signal for sufficiently long time until whole package and heat sink reach a thermal equilibrium as $T_j$ reaches a steady value $T_{j0}$, which can be noticed from observing $I_p$ gradually approaching a state of stability. Record this value as $I_{p0}$. Therefore, heat power can be readily calculated by $P_{th} = P_e - P_{opt}$. What we only need to find is current $T_j$.

**Step II**: Reduce duty cycle to make pulse width equal to 12 µs. As junction starts cooling, $I_p$ is decreasing, until whole LED package reaches a low-T equilibrium when temperatures of every unit, including junction, are equal to that of heat sink. Record the value of $I_p$ as $I_{pl}$ when it reaches a new steady value that is associated with heat sink temperature $T_h$, and at this moment $T_{jl} = T_{hl}$.

**Step III**: Raise temperature of heat sink, observe $I_p$ as it rises, and record temperature of heat sink as $T_{hh}$ when $I_p = I_{p0}$. At this very moment, whole LED package reaches a high-T equilibrium, and junction temperature is identical with $T_{j0}$, one when sample with full duty-cycle signal in Step I, as indicated from equality of their $I_p$. In addition, since there is no temperature deviation between junction and heat sink, $T_{j0} = T_{hh}$ is established. So far, one has to know all value for evaluating $R_{th}$. For samples, values in (1) are $T_j = T_{hh} = 51.9 \, ^\circ \text{C}$, $T_h = T_{hl} = 29.6 \, ^\circ \text{C}$, $P_e = 1.34 \, \text{W}$, $P_{opt} = 0.45 \, \text{W}$, and final thermal resistance turns out to be $R_{th} = 25 \, ^\circ \text{C}/\text{W}$.

While measuring thermal resistance, sample is subjected to an ideal driving condition greatly different from real working condition. For determining real junction temperature, one should exert sinusoidal voltage as input and calculate mean electric power.
One sets two Vp0 at 100 and 110 V, corresponding to root-mean-square voltage (Vrms) 70.7 and 77.8 V, respectively. Mean electric power can be captured and meanwhile measured optical powers. For comparison, a thermocouple is attached to chip to test chip temperature in a direct manner. Subscripts jm and jc denote the values measured by thermocouple and calculated via new solution respectively. Relative deviations for two voltages are limited to 1.2%, indicating a high accuracy.

**DISCUSSION**

A new solution for measuring junction temperature of ac-LEDs has been presented. Current amplitude of ac-LEDs subjected to a bipolar voltage pulse single is exploited to be the TSP after proving its linear temperature dependence experimentally. By finely adjusting heat sink temperature and monitoring shift in TSP one is capable to determine temperature deviation between junction and heat sink, which is most essential part and leads to thermal resistance of package, as well as junction temperatures under various working conditions.

**CONCLUSION**

A new solution for measuring the junction temperature of ac-LEDs is presented. Current amplitude of ac-LEDs subjected to a bipolar voltage pulse single is exploited to be TSP after proving its linear temperature dependence experimentally. By finely adjusting heat sink temperature and monitoring shift in TSP one is capable to determine temperature deviation between junction and heat sink, which is most essential part and leads to thermal resistance of package, as well as junction temperatures under various working conditions. Advantages of employing current amplitude as TSP are on one hand current data is easy to be captured, and on other hand, periodic signal facilitates quick repeat measurements, further enhancing accuracy. Bipolar-pulse voltage method is only applicable on ac-LEDs, and for dc-LED, input signal should be replaced with unipolar pulse voltage.

**Ethical Clearance**- Taken from AMET University

**Source of Funding**- Nil

**Conflict of Interest** - Nil

**REFERENCES**


[10] Deen, T., & Gohl, K., “3-D tomographic seismic inversion of a paleochannel system in central New


Skin Cancer - Computer Aided Diagnosis by Feature Analysis and Machine Learning: A Survey

S P Maniraj¹, P Sardar Maran²
¹Research Scholar, ²Scientist-D & Assistant Professor, Department of Computer Science and Engineering, Sathyabama Institute of Science and Technology, Chennai, Tamilnadu, India

ABSTRACT

One of the most dangerous forms of skin cancer is melanoma which increases the mortality rate compared to other form of skin cancers. It occurs in the skin typically, but occurs in eye, mouth rarely. The main treatment for skin cancer is surgery and the survival rate is very low if spread occurs. Mortality rates can be reduced by early detection through screening. The abnormality in skin can be diagnosed by a dermatology specialist through the interpretation of the Dermoscopic images. However, the rate of correct diagnosis by experts is estimated around only 75-84%. In this paper, recent advances for skin cancer diagnosis using computer aided diagnosis by features analysis and machine learning are reviewed. A comparative analysis of recent approaches in terms of sensitivity and specificity is also made.

Keywords: Skin cancer, Melanoma, Computer aided diagnosis, Machine learning, Feature analysis.

INTRODUCTION

Skin cancers are not positioning among the initial ten general cancers though they have exceptional malignancies worldwide. Cutaneous melanomas are the main reason for continuous raise in the occurrence of skin cancers over some decades [1]. The three primary skin cancers are Squamous Cell Carcinoma (SCC), Basal Cell Carcinoma (BCC) and malignant melanoma. Non-melanomatous skin cancers involve SCC and BCC which normally occur due to chronic exposure of ultraviolet sunlight.

The mortality rate is very high by SCC because it is more dangerous than BCC. Among the primary skin cancers, 80% are BCC, 16% are SCC and 4% are melanoma [2]. All the melanomas are not considered as skin cancer. It begins in melanocytes. The pigment melanin is produced by the cell which determines the color of hair, skin and eyes. Moles are also formed by melanocytes where melanoma regularly grows. One of the risk factor of melanoma is having moles, but it’s significant to remember that the majority moles do not become melanoma. In India, only about 1-2% of all diagnosed cancers are skin cancers. Figure 1 shows sample dermoscopic images (a) Normal lesion, (b) Melanoma.

In worldwide, the general form of skin cancer is BCC; however various investigations from India reported that SCC is the majority widespread skin tumor. Though, entire data of occurrence is not available, the occurrence of skin cancer in India increases from 0.5 to 2 per 100000 populations which is reported in various cancer registries. Also, the occurrence of skin cancers in India is less when compared to western world.

Early diagnosis of melanoma is very important to reduce the mortality rate. The early diagnosis mainly depends on the thickness of tumor. It is possible to completely cure the skin cancer if the tumor thickness is less than 1 mm [3]. Commonly, the melanoma is restricted to the skin and is consequently noticeable by easy assessment. Using the mnemonic, melanoma early signs are summarized as “ABCDE”: Asymmetry, Borders, Color, Diameter, and Evolving over time.
Medical decision of dermatologists can be supported by using an efficient CAD system for skin cancer diagnosis. CAD server copies the digital image data in a digital imaging and communications in medicine format and analyzed using various image processing approaches. Sensitivity (Sen) and Specificity (Spe) indices are generally employed to measure the performance of a diagnostic system which is defined in [4]. These indices are defined in the following equations.

\[
Sen = \frac{TP}{TP + FN}
\]

\[
Spe = \frac{TN}{TN + FP}
\]

where True Positive (TP) and True Negative (TN). Receiver operating characteristic analysis is the well traditional technique of evaluation for detection tasks. As the diagnosis of melanomas is difficult for dermatologists, CAD systems attempt to follow the procedure of dermatologists with the help of image processing techniques to discriminate benign and malignant melanoma.

This paper surveyed recent approaches for the classification or detection skin cancers using dermoscopic images. The accuracy of skin cancer classification system depends on the following two modules; feature extraction or feature analysis and classification or machine learning approaches.

**DIAGNOSIS OF SKIN CANCER**

**Feature Analysis**

Feature analysis based approaches normally examine the impulse characteristics of texture features. Mostly, texture features are extracted from a selected region called Regions Of Interest (ROIs) and then these ROIs are classified into familiar information categories. Three low level features with addition of texture, gradient, and irregular borders are characterized through Scale Invariant Feature Transform (SIFT) descriptors [5]. Local and global features like color, shape and texture features are applied to the whole lesion. Still, the significance of local features increases in various image analysis issues to achieve better accuracy [8].

2-D Fast Fourier Transform features set (FFT2), 2-D Discrete Cosine Transform features set (DCT2), complexity and size features sets are used for skin cancer classification. These features are extracted from de-noised image [7]. Fourier descriptors, moment invariants, symmetry and simple shape based features for skin cancer classification is described in [8]. Simple shape features such as area, rectangularity and compactness are extracted from the dermoscopic images. Symmetry related features are extracted from two ways; with respect to principal axis and opposite slices of lesions. Classic shape features are called as moment features and Fourier descriptors are invariant to rotation, scaling, translation and also give shape information.

The application of color, texture and shape features along with first color statistics, Gabor filter, Gray Level Co-Occurrence Matrix (GLCM), Histogram of Oriented Gradients (HOG) and local binary pattern are examined for skin cancers [9]. These features are used in many computer vision and pattern recognition algorithms for diagnosing diseases. Discrete shearlet transform is employed for decomposing the training Dermoscopic images at given resolution level. The energy of shearlet coefficients of all the directional sub bands is computed and these energy values are considered as features. They are used as one of the inputs to the final phase for the classification process [10].

Non-Sub Sampled Contourlet Transform (NSCT) is discussed using double iterated filter banks to identify point discontinuities by a Laplacian pyramid and directional features using directional filter bank [11]. The approximation of given image is allowed into smooth contour at different decomposition levels. ABCD rule criteria is used for skin cancer diagnosis where Asymmetry (A), edge (B), colors (C) and vascular structure, associated regions, blue-whitish area, pigment network, dotted beaded structure (D) [12].

FFT2 (4 parameters), DCT2 (4 parameters), complexity feature set (3 parameters), color feature set (64 parameters) and pigment network feature set (5 parameters) are employed for feature extraction stage to classify the melanoma image [13]. A segmentation approach to extract the lesion area by applying edge detection technique is discussed in [14]. From the lesion area, features like geometrical and color are extracted for classification. Initially, data is divided into 10 partitions and then HSV, opponent, Amp and Gabor filters are employed by combining each other for feature extraction purpose to give better results for melanoma classification in [15].
Color identification using quad tree decomposition technique is described in [16]. From the decomposed images, the related feature subsets are extracted. Mean, energy, entropy, and direct ground truth are the different descriptors used for the classification. 36 color features and 14 shape features with three different databases are discussed for skin cancer classification in [17]. Trained technicians manually segment the images to get the information of nearby healthy skin to lesion skin.

Histogram thresholding method is used in [18] for segmentation due to distinct colors or intensities in the regions of foreground and background of an image. After segmentation, features such as color, shape and texture features are extracted. Solidity, compactness, equivalent diameter and border irregularity index are included in shape features. Mean, variance, and standard deviation are included in color features. Texture features such as energy, entropy, homogeneity and contrast are employed in [19] for skin cancer classification. The affected regions are segmented using thresholding and then lesion is localized by computing statistical properties such as area and center of mass.

Machine Learning

Machine learning based classification methods are very familiar recently in many pattern recognition techniques which capture unidentified primary characteristics efficiently. The main aim of machine learning is to recognize complex patterns and classify them smartly by learning automatically. Random Forest (RF) classifier uses SIFT features in its sparse representation for skin cancer classification by a 10-fold cross validation model [5]. It has a dictionary size of 800 and 100% sensitivity is achieved by 2nd level of sparsity.

Support Vector Machine (SVM), Adaboost and K-Nearest Neighbor (K-NN) classifiers are evaluated using various grouping of parameters both in classification and feature extraction phase [6]. In K-NN, feature vectors are compared by using its neighbors and distances. In SVM, different kernels are used and weak classifiers are combined in Adaboost. Using FFT2 and DCT2, features are extracted and one level and two level classifiers are employed in [7] using SVM classifier to improve the classification rate of melanoma with 97.7%.

To select best features from Fourier descriptors, moment invariants, symmetry and simple shape based features, Adaboost with decision stump as weak classifier with minimum number of parameters is used in [8]. Multiple decision trees using RF classifier with a various bootstrap sample and weighted combination ensemble such as SVM, Linear Discriminant Analysis (LDA) and RF are described in [9] for skin cancer classification. There is no need for validation test while using RF classifier, in weighted combination where partial training set is kept for the validation set. Features used for extraction are color variance and color histogram, shape features, GLCM, HOG and Gabor filter etc.

Kernel based SVM classifier is used for classification in [10] based on features extracted by discrete Shearlet transform. The energy of Shearlet coefficients of all the directional sub bands is computed and these energy values are considered as features for the classification process. Bayes classifier is suggested in [11] which provides logical and rich backup. NSCT based features are extracted from the training images using double iterated filter banks to identify point discontinuities using Laplacian pyramid which is given as input to the classification stage.

ABCD criteria based four classifiers; SVM, K-NN, ANN and Decision Tree (DT) classifier is discussed in [12]. Five feature sets with a total of 80 features based classification is explained in [13]. They are given to one level classifier (A) and two level classifiers (B and C). Naïve Bayes, Adaboost, K-NN and random trees are tested for skin cancer classification using geometrical and color features [14]. 153 benign lesions over 160 and 34 melanoma images over 40 are correctly classified by Adaboost classifier with precision rate of 93.6%. SVM, RF and K-NN classifiers are employed with color and texture features in [15]. RF classifier provides sensitivity of 90% and specificity of 96.25%. Sensitivity of 92.5% and specificity of 91.25% is achieved by SVM classifier. Finally using the concatenation of features, RF classifier gives best results in [15].

Every block of segmented image is assigned to its neighboring color patch in equivalent coordinates system. Nearest neighbour method is a correspondence search for finding the closest points in the distance space [16]. Both color and shape features are combined to achieve high classification accuracy using SVM classifier [17]. ANN classifier based feature extraction using discriminative features achieves 88.9% accuracy [18]. Feature extraction is done after segmenting the lesion part using histogram thresholding technique.
Lesion is classified into benign or malignant based on total Dermoscopy score \[^{19}\] which is computed by the summation of four extracted feature scores. All the scores are multiplied by their individual weights before summation. SVM classifier is trained by texture, color and shape features for skin cancer classification \[^{20}\]. The features are fused and then Boltzman entropy method is employed to select dominant features.

**DISCUSSION**

It is very difficult to identify melanomas by practiced dermatology specialist. Recently, CAD systems play a vital role in many medical diagnoses and provide higher accuracy, efficiency, stability and scalability. Hence, the outcome of CAD systems can be used by the specialist. A comparative analysis of recent approaches for skin cancer classification on PH\(^2\) database \[^{21}\] is shown in Table 1. PH\(^2\) database is freely downloadable \[^{22}\]. All images in PH2 database are colour images with a resolution of 768x560 pixels and obtained from Dermatology Service of Hospital Pedro Hispano in Matosinhos, Portugal. This dermoscopic image database includes 200 images (40 melanomas, 80 common nevi, and 80 atypical nevi). PH\(^2\) database contains ground truth data for segmentation analysis as well as abnormal severity for classification purposes.

**Table 1 Comparison of recent approaches in skin cancer classification**

<table>
<thead>
<tr>
<th>Features</th>
<th>Classification technique</th>
<th>Performance Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Sensitivity</td>
</tr>
<tr>
<td>SIFT sparse-coded feature [^{5}]</td>
<td>RF</td>
<td>100</td>
</tr>
<tr>
<td>Global features [^{6}]</td>
<td>KNN, SVM, Adaboost</td>
<td>93</td>
</tr>
<tr>
<td>FFT2, DCT2, size and complexity features sets [^{7}]</td>
<td>One level &amp; two level classifier</td>
<td>90.6</td>
</tr>
<tr>
<td>Fourier descriptors, moment invariants, symmetry related &amp; Simple shape [^{8}]</td>
<td>Adaboost with a Decision Stump</td>
<td>96</td>
</tr>
<tr>
<td>Global features, CLBP, GLCM, Gabor filter, HoG [^{9}]</td>
<td>RF, SVM, LDA</td>
<td>94</td>
</tr>
<tr>
<td>NSCT based energy features [^{11}]</td>
<td>Bayes classifier</td>
<td>97.5</td>
</tr>
</tbody>
</table>

**CONCLUSION**

It is inferred from table 1; a maximum of 96.7% accuracy is achieved using NSCT based energy features in \[^{11}\]. FFT2 and some feature sets based approach in \[^{13}\] give 96.5% accuracy. As machine learning algorithms are data driven, the accuracy of any classification approach depends on the training data quality. It is observed from the survey that more consistent, scalable and efficient method with higher accuracy is needed to classify the skin cancers.
In this survey paper, various categories of classification methods with its feature extraction techniques are discussed. NSCT based energy features using Bayes classifier achieved more accuracy when compared to other existing methods for PH2 database. It is concluded that melanoma is diagnosed using various image processing and machine learning algorithms. As machine learning algorithms make intelligent decisions based on the only, the extracted features should discriminate the features from normal to lesion and vice versa which in turn increases the classification accuracy.

Ethical Clearance - From Sathyabama Institute of Science and Technology

Source of Funding - Self

Conflict of Interest - NA

REFERENCES


15. Coelho AV. Early Detection of Skin Cancer Based on the Combination of Multiple Features. 1-9.


Utilization of Information Technology in Teaching English Literature

Christalin Janet
Assistant Professor, Department of English, AMET University, Chennai

ABSTRACT

In Chinese schools and colleges which have literature major has increasingly underestimated as of late since English writing has become customary centre of English language. Likelihood of changing minimized status of English writing course through examining utilization of late stage and blogs as two data advancements in educating and learning process has to be investigated through endeavours. It has been presumed as another use of data innovation in training, instructing of English writing course with regards to board stage and blog can rouse a progression of changes in showing ideas, showing mode, showing substance and instructional method, and rejuvenate conventional course of the humanities by spurring the educator’s showing activity and understudy’s learning premium and advancing their cognizance and capacity of self-intelligent instructing and independent learning through exact research. 80% of sample students are of opinion thinking having been benefited a lot from blog assisted teaching and learning, 18% acknowledged positive effect of blog-assisted English literature course in improving their reading skills and critical understanding and activating their education initiatives, only 2% sample students did not feel advantages of blog-assisted teaching and learning.

Keywords: English literature; information technology; blackboard (bb) platform

INTRODUCTION

Alongside China’s opening up and change in the late 1970s, English has played a more vital part in individuals’ financial, social and social life. Especially since the 1990s, in the financial and social connection brought by globalization, China’s advanced education has gained an impressive ground, with a huge development in enlistment. In the extending procedure, the current scholarly and social scene of China’s training has been incredibly affected by Western musings and streams in both positive and negative terms. The humanist perplexity of English is explained by [1]. Decidedly, the advance made in both showing thought, mode, instructional method and display innovations are verifiable; the adverse impact incorporates the predominance of instrumentalism, which ignores the significance of customary humanism and good esteems in training. A survey of teaching English is discussed [2]. As a show of education and scholastic review, English has viewed as only an instrument or specialized dialect for only commonsense and expert purposes. From one perspective, there is an “English fever” halfway fortified by the accomplishment of 2008 Beijing Olympic Games and the up and coming Shanghai Exposition in 2010. On the other hand, with the improvement of outside situated economy calling for more experts capable with English dialect, English majors in schools and colleges are encouraged to change their educational programs to take care of the demand of work market, for instance, adding another claim to fame to English major, for example, “English + Foreign Trade,” “English + Law,” “English + Journalism,” and so forth. The symptom in doing “English + claim to fame” educational programs changes self-evident. Teaching English literature online is described by [3]. The natural connection between the English dialect and its humanist, scholarly, and social ramifications is discretionarily softened up going for viable motivations behind the language. Therefore, English instruction has progressed toward becoming absolutely the individual preparing of dialect abilities, and in result “the learning structure and scholarly improvement of significant English graduates are obviously substandard contrasted and alumni of different majors.” Globalization and teaching literature is explained by [4]. Thus, English
has peeled off its hidden scholarly, tasteful and social implications and English training has planned and done as far as an instrumental reason. As one of the center courses of English significant, English writing has underestimated in the educational programs. Various instructors and researchers have cautioned the potential peril of the minimized status of English writing in schools and colleges. A survey of teaching is discussed by \[5, 6\].

Various reviews talk about the underestimated status of English and American writing courses when exploring different avenues regarding showing writing in the new settings. It is currently earnest to think about a few techniques to manage the underestimated status of English writing course, especially since far as showing mode and instructional method. Present day data innovation gives a decent point of view and means for transforming the educating of English writing in Chinese schools and colleges. This paper, through applying present day data innovation, i.e., writing board stage and blog into teaching and learning process, endeavours to investigate the likelihood of transforming the common showing idea, mode and technique for English writing course through an observational research completed in Shandong Economic University.

**TEACHING ENGLISH LITERATURE THROUGH**

**Blackboard platform**

Present day data innovation gives a large space to transforming English dialect educating and adapting everywhere throughout the world. Chinese dialect instructors and approach creators have accentuated the enormous capability of current PC and system innovations for teaching outside dialect in the nation. For quite a while, the instructing of English writing in China had a tendency to embrace the monolog mode in favour of educators, with understudies as potential beneficiaries of information. In light of constructivist learning hypothesis, the utilization of data innovation in English writing instructing expects to reinvigorate the learning enthusiasm of understudies and showing eagerness of educators both inside and outside the classroom. The new showing mode focuses on the relative self-governing subjective office of a substitute.

**Uploading Course-Related Materials**

Writing board stage makes a counterfeit learning condition by joining sound, picture, and words into the educating and learning process, which advances the collaboration amongst educators and understudies in supplementing classroom exercises. It broadens and opens up the capacity of showing mode and instructional method and helps teachers alter their instructing activities. Above all else, we transferred some necessary course materials onto the board stage, which incorporates things, for example, “Instructors’ Information,” “Exploration Papers,” “Syllabus,” “Showing Calendar,” and “Recommended Readings.” “Educators’ Information” for the most part gives the understudies some individual data of instructors, for example, their training foundation and academic experience, ability, what’s more, research field. It is intended to encourage the correspondence and collaboration amongst instructors and understudies.

“Look into Papers” gives substitutes some exploration results apparently educators and other most recent research data in the instructing and investigation of English writing, covering both showing research papers and scholarly research papers. It intends to furnish understudies with the most recent studies patterns and streams of the field and build up their capacity of academic review and constant speculation when perusing works of writing. In the meantime, course instructors are urged to absorb and apply this most recent research comes about into the showing routine with regards to English writing. For understudies, this thing can help advance the nature of scholarly composing when they are required to produce their B.A. proposal in the fourth year. “Syllabus” presents the English writing course as one of the necessary course in English B.A. program. It is intended to familiarize understudies with some fundamental information about British writing and to upgrade their capacity to peruse the scholarly messages. It determines the central prerequisites for understudies, for example, 1) read the first works of real British essayists; 2) comprehend the advancement and qualities of British writing and some scholarly streams and schools; 3) investigate the writings from the Chinese viewpoint, and impart their basic reactions orally or in composed frame. It likewise presents the showing center in every part of the course book and the method for assessing execution toward the finish of the term. In this manner “Syllabus” endeavors to acquaint learners with the showing point, content, arrangement so they can obtain the cognizance
of purposive review and precisely find the course in the B.A. program. As it were, through these last two things, learners would understand that English Literature class expects to outfit them with semantic ability, as well as humanist measurements in creating autonomous, inventive and essential considering. Our capacity to conceptualize, break down and to some degree to feel is subject to our ability to utilize dialect precisely and newly. An element of writing is to use the methods for correspondence in specific and successful courses, and to take part in writing is to participate in a proceeding with the procedure of refining our abilities to utilize dialect, and our sensibilities to great dialect utilize. The book investigates the surface and significance of human involvement in a perplexing, convincing manner, and leads us to knowledge, beautiful reflection, and insight concerning our lives and the way of human experience. In this way, writing can enhance human judgment and fortify individuals’ feeling of moral quality. “Instructing Logbook” isolates the course into various parts as far as the weeks of the semester. As indicated by this thing, understudies can make an efficient arrangement and bear the educating and learning process because of major and minor information focuses in concentrate the English writing course. “Proposed Readings” show some valuable reference books and sites for the investigation of English writing toward the finish of every section, which helps learners with the most recent educating and research data in developing their imaginative considering and growing their scholarly vision.

RESULT AND DISCUSSION

With unanimously positive comments on effect of blog-assisted teaching and learning learners tend to show more interest and initiative in learning English Literature through applying blogging into English literature in the spring semester of 2008. Among 100 investigated students of both English majors and non-English majors, 25 of them made significant progress in their reading skills; 68 of them made visible progress in critical competence; only seven students’ showed little progress in both. 80% of sample students are of opinion thinking having been benefited a lot from blog assisted teaching and learning, 18% acknowledged positive effect of blog-assisted English literature course in improving their reading skills and critical understanding and activating their education initiatives, only 2% sample students did not feel advantages of blog-assisted teaching and learning. While acknowledging benefits of blogging in English literature course, one has to aware of those disadvantages in blogging. For useful way of improving the quality of education one has to analyze blogging which cannot take place in classroom teaching considering both limits having technological innovations and nature of English Literature course.

CONCLUSION

It is a surprising marvel that as one of the fundamental courses of liberal instruction, English writing has turned out to increasingly minimized in the humanities of China’s schools and colleges. The use of present-day data innovation in training has given another chance to the educating and learning of English writing, particularly the developments in system innovation have reinvigorated the typical course of the humanities in each possible way, rousing changes in showing idea, showing mode, showing substance, and teaching method. The experimental research demonstrates that teaching English writing with regards to data innovation can extraordinarily actuate the instructing and learning activity on both sides of educators and understudies, advancing their cognizance and capacity of self-intelligent instructing and independent learning. Along these lines applying data innovation into the instructing and learning of English writing can bail this common course of the humanities out of the underestimated status in a more popularized world.

Ethical Clearance- Taken from AMET committee

Source of Funding- Self

Conflict of Interest - Nil

REFERENCES

52-55.


Knowledge Management Utilized to Developing College English Teaching Group

K Manigandan

Assistant Professor, Department of English, AMET University, Chennai

ABSTRACT

A lot of inner and outside information approaches teachers of English College which appears as uncommon gatherings. In this paper, the speculations of KM and Learning Organization are received to help develop an effective college English teaching group in a college. In course management MK stage proposed has been extraordinary for instructing and learning of school English, principle structure of part can be organized on premise of course. Present review tries to apply the hypothesis of KM to help build College English teaching group into a learning association and enhance their educating and research abilities on knowledge management (KM) stage. KM framework offers a stage for teachers and understudies to effortlessly download and transfer data, examine issues and convey on lines. Well planned and management of stage will encourage successful creation, putting away, recovering, sharing and applying of information on college English teaching and learning.

Keywords: knowledge management (KM), College English Teaching Group, learning association.

INTRODUCTION

College English is an obligatory course for each understudy, regardless of he or she majors in math’s, prescription, law, finance or whatever other strengths. A Framework for collaborative learning system is discussed by [1]. In this way, every college or school has an expansive number of staff showing College English, they frame an uncommon gathering. Improving teachers’ knowledge management is described by [2]. They instruct a similar course in their own particular manners, they scan for showing materials from various assets, they put away and refreshed them when important, which for the most part cost them a ton of time. An automated approach to assessment management is explained by [3]. Through years of educating, each College English teacher ought to have had a great deal of showing background and have amassed a lot of valuable showing data, obviously, they ought to likewise have met with an extensive variety of issues and riddles. Smart classroom management is discussed by [4]. In a word, in spite of the fact that they educate a similar course, they simply act as a solitary unit. So how to compose the educators in a college together to frame a group where they can share their experience and data, talk about their issues and make their showing more viable is an issue worth our endeavors to illuminate. Motivation factors that make knowledge workers share their tacit knowledge and a framework of knowledge sharing are described by [5, 6].

KM and Learning Organization are two ideas begun in business organization and data framework to start with, yet now their applications have reached out to an ever increasing number of fields, which incorporates data and media, E-business, library, general wellbeing, tourism and human asset administration, and so forth. In this paper, the speculations of KM and Learning Organization are received to help develop an effective college English teaching group in a college. IT support for knowledge management within R&D and Education is discussed by [7, 8].

PROPOSED SYSTEM

The key purpose of this review is that, amid the school English teaching process, there is a lot of information being utilized or created, regardless of its crude materials, information, thoughts, experiences or convictions, and regardless of what sort of learning we named them. The framework ought to incorporate a few modules, for example, course management, showing asset, inquire about asset, educators’ discussion,
understudies' voices, instructor understudies intelligent range, and so forth. Instructors and understudies ought to have their own rights and points of confinement to visit the framework and can without much of a stretch access the distinctive parts of the framework.

In course management MK stage proposed has been extraordinary for instructing and learning of school English, principle structure of part can be organized on premise of course and can be isolated into 4 sections, for example, College English 1, College English 2, College English 3 and College English 4. Beneath each part, there ought to be sub-some portion of section or unit, for example, Unit 1, Unit 2, Unit 3, and so forth, and underneath every section or unit, it ought to cover four fundamental dialect learning aptitudes: Listening, Speaking, Reading and Writing.

Teaching Resource: to incorporate sub-modules as: electronic teaching plan, multi-media courseware, slides, showing video, helpful connections, and so forth it has been useful. Instructors are urged to transfer their own particular teaching arranges, multi-media courseware and other teaching assets some great teaching assets they found from different sources. It has been well known College English necessitates courses in almost every college and school for non-English majors. Immense number of college English instructors in across nation constitutes an important outside learning asset which can be made usable by showing their assets and strategies. Prerequisites for English are distinctive because of diverse subjects being set up while teaching assets gathered by teachers of one's own college or other colleges are vital also, in light of fact which every college has its own attributes, for instance understudies’ passage English level shifts from college to college. Methodologies and strategies received by their own educators for most part tailor made betterment of their understudies and structures a profitable inward knowledge asset by a particular way. Inside and outer knowledge assets ought to be very much overseen and be made helpful to instructing and research work.

Research Resource: Here it covers sub modules as: data of universal gatherings look into propensities, hotly debated issues of college English educating and research, suggested articles on diaries, valuable research data joins, and so forth. Educators can utilize part to trade their feelings on research with partners and offer bits of knowledge about a few issues of basic interests.

Teachers’ Forum: here it covers the sub modules as: teaching techniques look into strategies, specific subject talk, between-staff cooperation, related data, and so on. Teachers can speak with each other by leaving messages or debating on-line, additionally urged to open own web journals to impart insights.

RESULT AND DISCUSSION

Students’ Voices: Here it understudies expresses suppositions on College English course teaching conditions, which give reactions to educators’ teaching procedures and techniques, advanced issues while meeting amid learning and giving recommendations or advices on viable instruction. Also, in “educator understudies intuitive range”, one can leave messages for a particular instructor or advanced a few inquiries for any educators in college to offer arrangements.

In a word, KM framework offers a stage for teachers and understudies to effortlessly download and transfer data, examine issues and convey on lines. Well planned and management of stage will encourage successful creation, putting away, recovering, sharing and applying of information on college English teaching and learning.

CONCLUSION

The way toward teaching College English is a procedure joined by a lot of outside and inner information. The presentation of KM hypothesis into this procedure enables school English educators to make more successful utilization of their insight and frame a group where they can add to the best degree their collected information and in the meantime share important hierarchical experiences and ability. This incredibly diminishes repetitive work, develop instructors’ imaginative mindfulness and critical thinking limit, and the vast majority of all, their school English educating and research capacity is extraordinarily made strides. The preparatory use of the framework has demonstrated some reassuring impacts.

Ethical Clearance- Taken from AMET committee

Source of Funding- Self

Conflict of Interest- Nil

REFERENCES

1. Zhao R, Zhang C. A Framework for collaborative learning system based on knowledge management.


7. Svetsky S, Moravcik O, Stefankova J, Schreiber P. IT Support for knowledge management within R&D and Education. In Interactive Collaborative Learning (ICL), 2012 15th International Conference on 2012 Sep 26 (pp. 1-6). IEEE.

Study of Eddy Current in Litz Wire Using Integral Equation

Paulraj Jayasimman

Assistant Professor, Department of Mathematics, AMET University, Chennai

ABSTRACT

Eddy current misfortune in a Litz wire which has three-dimensional structure is investigated utilizing the necessary condition technique considering the nearness impact. In the present technique, each wire is displayed as a polygonal line. The paper described that the current channeling in time-domain airborne electromagnetic data and the Domain decomposition for 3D electromagnetic modeling. This method is also applied to the analysis of three different wire models, that is, parallel wires, multiple strands, and rope lay, where the second and third models correspond to the Litz wire and the Conductivity-depth transformation of slingram transient electromagnetic data presented. One-dimensional necessary condition is understood for the dipole charge created by the counter parallel eddy current in the wire. The discretized vital condition can viably be explained utilizing an iterative technique solver to figure the Eddy current appropriation in the wire because of the closeness impact.

Keywords - Litz wire, complex permeability, integral equation, eddy current, proximity effect, two potential method

INTRODUCTION

It has turned out to be essential to assess the whirlpool current misfortunes in multi-turn curls and Litz wires utilized as a part of the electric machines and gadgets as a result of increment in the driving recurrence. Semi-Analytical Approach for Finite Element Analysis of Multi-turn Coil Considering Skin and Proximity Effects is explained by [1]. The whirlpool current misfortunes in the multi-turn loops and Litz wires are brought on by the skin and closeness impacts. While breaking down the swirl streams by limited component technique (FEM), we need to discretize the wires into fine components to consider these impacts [2]. A homogenization technique for examination of multi-turn curls and Litz wires have been proposed in [3]. In this technique, the curl locale is demonstrated as a uniform material which has an indistinguishable naturally visible trademark from the first loop. However, it remains to be difficult to analyze twisted or woven structures which Litz wires have because the homogenization method is formulated assuming for simplicity that wires are parallel to each other [4].

In this paper, it will be demonstrated that the intricate forces of a multi-turn loop figured by the present technique concur well with those processed by the traditional FEM. By utilizing two possibilities strategy and the Experimental and numerical simulation of magnetic pulses for joining of dissimilar materials with dissimilar geometry using electromagnetic welding process is presented in this paper, this technique can likewise be connected to the loop twisted around an attractive center and the Magnetic Pulse Welding of Two Dissimilar Materials with Various Combinations Adopted in Nuclear Applications. In this paper described that the Current channelling in time-domain airborne electromagnetic data and the Domain decomposition for 3D electromagnetic modeling presented in this paper. This method is also applied to the analysis of three different wire models, that is, parallel wires, multiple strands, and rope lay, where the second and third models correspond to the Litz wire and the Conductivity-depth transformation of slingram transient electromagnetic data presented in this paper. The discrete time system is explained in a discrete time retrial inventory system with d-map demands [5-6].

FORMULATION

To consider an inaccessible round wire, radius a, conductivity σ, relative permeability μ, absorbed in a time-harmonic magnetic field of angular frequency ω. Curvature of wire is assumed to be negligible so that
field is two dimensional. Eddy currents and corresponding dipole fields due to proximity effect as shown in Fig 1 can be obtained by analytically solving two-dimensional Helmholtz equation. Wire has diamagnetic property due to anti-parallel eddy currents flowing along wire. This property can be represented by introducing the complex permeability \( \mu \) given.

\[
\mu = \mu_0 \frac{J_1(z)}{z J_1'(z)}
\]  

(1)

Presently we consider a heap of round wires along which convey rotating streams. The vortex current misfortunes in the wire because of the skin and vicinity impacts can be independently decided in light of the orthogonality between them. The previous can without much of a stretch be figured by the diagnostic strategy. The eddy current circulation in the wires must be resolved self-reliably. At that point, we consider the perplexing charge vector \( M \) opposite to the wire pivot which is produced by the counter parallel swirl streams. We expect that \( M \) is steady in the cross segment of the wire, and it has one-dimensional dissemination along the wire. The connection amongst \( M \) and the attractive field \( H \) opposite to the wire is given by \( M = (r - 1)H \). The attractive field \( H \) is made out of \( H_0 \) produced by outside streams and segment because of the unpredictable polarization \( M \) disseminated along the wire. At that point, we get the accompanying one-dimensional necessary condition for \( M \):

\[
\frac{M(x)}{\mu_r - 1} = \tau \times \int_{\Omega_0} \left[ \mathcal{G} M d\nu' + H_0(x) \right] \times \tau 
\]  

(2a)

\[
\mathcal{G} M = -\frac{1}{4\pi} \frac{M(x')}{R^3} \frac{\left[ M(x') \cdot R \right]}{R^5} 
\]  

(2b)

\[
\frac{V I^*}{2} = \frac{j}{2} \int_{\Omega_c} A \cdot J^* d\nu + \frac{R_0 z J_1(z)}{4 J_1'(z)} |I|^2 
\]  

(3)

\[
A = \frac{\mu_0}{4\pi} \int_{\Omega_c} \frac{M(x') \times R}{R^3} d\nu' + \frac{\mu_0}{4\pi} \int_{\Omega_c} \frac{J(x') \cdot R}{R} d\nu' 
\]  

(4)

\[
L_i = \frac{\mu_0}{2\pi} \left( l_i \log \left( \frac{l_i + \sqrt{l_i^2 + a^2}}{a} \right) - \sqrt{l_i^2 + a^2} + a \right) + \frac{\mu_0 I_i}{8\pi} 
\]  

(5)

\[
\text{rot} \text{rot} A_t + j\sigma \omega A_t = 0, \quad \text{in} \quad \Omega_t 
\]

\[
\text{rot} V_0 \text{rot} A_t = 0, \quad \text{in} \quad \Omega_r 
\]  

(6)

In above mentioned formulation one has to consider current-input problem where same currents are assumed in all wires although currents which would differ from each other in actual Litz wires. Here consider voltage-input problem. Voltage at terminals of each wire is set to a given voltage \( V \). Because integral equation cannot be solved if \( J \) is not given, if employed with following iterative method, integral equations including new currents are solved again for \( M \) after iteration can be determined by the currents \( I_i \) for given \( V \) self-consistently.

**RESULTS AND DISCUSSION**

Proposed method and conventional FEM based on homogenization method described in\(^1\) to 100-turn coil
model shown in Fig 2. Radius of wire is 0.5 mm, and conductivity of wire is \(5.76 \times 10^7\) S/m. In discrete, each wire is subdivided into 100 line fragments with equivalent length. It demonstrates frequency normal for unpredictable forces acquired by both techniques. Dynamic forces are in great understanding from low frequency to high frequency. Most extreme distinction is 3%.

![Fig 2. 100-turn coil and 100-turn coil wound around a magnetic core](image)

Active power in parallel strands is highest in low frequency because DC resistance of parallel model is lowest of three models. Active powers decrease as frequency becomes higher because impedance of wire increases due to proximity effect.

**CONCLUSION**

Proposal for technique in view of one-dimensional necessary condition for charge created by swirl streams because of the nearness impact has been necessary. By utilizing, without much of a stretch model confused windings one need not discrete wire cross area and protector between curls into components. It has been demonstrated, dynamic forces figured by proposed strategy are in great concurrence with those processed by customary FEM which needs fine discrete of wire and protectors. It has been numerically demonstrated by vortex current misfortunes in Litz wire models are littler in correlation with parallel strands.

**Ethical Clearance**- Taken from AMET University

**Source of Funding**- Self

**Conflict of Interest** – Nil

**REFERENCES**

Differential Quadrature Method Using Obtained Poisson Equations

G Genitha

Assistant Professor, Department of Mathematics, AMET University, Chennai.

ABSTRACT

Differential quadrature strategies are conceived to numerically fathom common and fractional differential conditions by approximating the subordinates of the obscure capacity at purposes of a cloud defined on the area of enthusiasm as weighted aggregates of the estimations of such capacity at different purposes of the cloud. Local renditions of this class of meshless techniques limit the focuses utilized as a part of such extension, by building up appropriate supporting areas. In this work, we introduce the neighbourhood differential quadrature technique (LDQM) and we utilize it to take care of a limit issue in electromagnetism. With a specific end goal to do this, we assess the numerical arrangements of the Poisson condition on a two-dimensional area. Proposal for an option definition of supporting district has yielded preferred arrangements over regular one. Pull mean square blunders for approximations with both (option and regular) definition of neighbourhood backings are got and conditions with thickness of hubs are contemplated. Best exactness acquired with option definition of local support is due to smaller condition numbers of linear systems yielded.

Keywords: Condition number, POISSON equations, differential quadrature method, Numerical simulation, LDQM.

INTRODUCTION

Discretization involves in many traditional methods which has been devised to numerically solve partial differential equations, as finite element (FEM), finite volume (FVM) and finite difference (FDM) methods, leads to some kind of mesh structure defined on the domain of interest. Despite of widespread use of such methods in many areas of engineering and applied sciences, dependence on mesh constitutes a serious drawback, especially in cases in which frequent re-meshing is necessary, or geometry of domain of interest is not regular or smooth [1, 2].

In order to circumvent such difficulties, in last decades one has witnessed development of several numerical methods [3] that do not depend on an underlying mesh structure. These methods are known as mesh less or mesh-free methods. Inspired on the Gaussian quadrature for expansion of integrals, a class of mesh less methods, currently known as differential quadrature methods, was proposed by Bellman and co-workers [4] in late seventies. Class has been based on approximation of a (partial or ordinary) derivative of a function at a given point — called node — as a weighted sum of values of same function at other nodes previously scattered on domain of interest. Generation of inflow turbulence using local differential quadrature method is explained by [5]. In boundary and/or initial value problems, quadrature methods finds approximate value of unknown function on each node by solving a set of linear or algebraic equations yielded by expansion of derivatives and by boundary/initial conditions.

Local version of the differential quadrature method (LDQM) has been a worry. In original formulation of LDQM, nodes employed in approximation of derivatives at a particular point (reference node) are chosen in a neighbouring region around it. Reference node itself and its neighbours form a set known as supporting region (of reference node). Particular approach intended to circumvent problem of ill-conditioning of coefficient matrices of large linear systems yielded by global quadrature methods. Shu and co-workers present an implementation of a LDQM using radial basis functions (RBF) in local evaluation of weighting coefficients involved in expansion of derivatives of unknown function In Ref. [6, 7]. Such implementation has been
RESULTS AND DISCUSSION

Numerical tests were completed in the two-dimensional area $\Omega$ with a specific end goal to get the surmised arrangement of a limit esteem issue involving Equation utilizing LDQM in view of RBF for two distinctive definitions of the supporting locales, SAP and ES. For purpose of examination of these definitions of supporting areas, we built up the accompanying capacity. As the corresponding exact solution of the boundary problem involving the Poisson equation on the two-dimensional square domain. Both Dirichlet boundary conditions and the surface charge density are set up in order to be consistent with uex. So, in our simulations, we employed

CONCLUSION

It is verified that LDQM in light of RBF with ES yields more precise outcomes than with the ordinary SAP. As it is appeared in the correct board, the ns x ns frameworks constituted by ES have better molding if contrasted and SAP, in any event all things considered. The higher exactness with ES might be identified with alleviation of not well molded straight frameworks delivered by the collocation of RBF at focuses near each other, as it is brought up by Ball et al. in. Actually, the normal separation between the hubs of each supporting district in ES is more noteworthy than the comparing one in SAP. Along these lines, in spite of bypassing the terrible molding regularly seen in worldwide renditions of quadrature strategies, the paradigm to pick hubs making the supporting areas can enhance the precision in the neighbourhood approaches.

As pointed out above, LDQM is a promising class of meshless strategies; however its utilization in issues of electromagnetism still stays early. Our reviews here have demonstrated that LDQM in view of RBF produces arrangements one request of size more exact than FEM with the same number of hubs with a comparable
computational cost and better joining.

**Ethical Clearance** - Taken from AMET University committee

**Source of Funding** - Self

**Conflict of Interest** - Nil

**REFERENCES**


Far-Field Distribution of High Power Laser Beam

M Suresh Kumar
Assistant Professor, Department of Physics, AMET University, Chennai

ABSTRACT

For fiber laser pumping, the main sources are fiber coupled laser diodes. The analysis of bipeak structure of optical intensity distribution in parallel and perpendicular direction to the junction is required to obtain high power and high brightness. Race tracing method and numerical integration algorithm are using to obtain the angular power distribution. This paper is dealing with designing of high brightness and high power laser diodes. The collimation properties of high power diode laser pillar through tube shaped viewpoint in broke down by beams following in the quick pivot and moderate hub, individually the module of high power semiconductor laser is investigated and checked. The principal mode exists toward the path opposite to the intersection plane, for the presence of multimode high power yield, the emanating zone is reached out to a stripe of 200–300μm toward the path parallel to the intersection plane which is in light of dynamic layer of a micron that is altogether smaller than the wavelength. Under the direction of this paper, a yield of 101.68w was acquired from 105m/0.15NA fiber in 976nm module with a coupling productivity of 85% and a brilliance of 16.63 MW•cm⁻²•str⁻¹.

Keywords- High power diode laser, Far-field distribution, bipeak structure, fiber coupled laser diodes

INTRODUCTION

In Pumped fiber lasers, the welding of metallic materials, surface solidifying, cladding, metal cutting the expansive prospects in logical and mechanical fields has High-control, high-shine diode laser frameworks in view of multi-producer or bars [1]. With the advancement of high power diode laser strategies as of late, including the high CW divider plug proficiency (>70%), 24.6W discharge from single gadget with 96ȝm stripe-width, yield energy of 203 W from quantum course laser (QCL) gadget in beat mode at 283 K with an edge width of 300ȝm, a hole length of 5.8 mm, and a tilt point of 12°, more than 1kW persistent wave yield control from one centimeter laser bar, lifetime >10,000hrs under CW high power operation numerous achievements had been made in the single semiconductor laser gadgets [2]. The water treatment on chip the nature of laser diode is performing Casing and Rotating while Cementing in the yield bar because of the impact of optical cavity structure the dependability of current control. the unique state of the light era region prompts exceptional light radiating attributes, which demonstrates a high disparity (60°) toward the pn-transition(“fast axis”),and a lower divergence(10°) in the other (“moderate hub”) uses industrially accessible single producer or diode laser bar.

A complex field circulation structure toward the path parallel to the intersection emanates regions stretch out to 200–300μm expansive stripe [3] for acquiring additional controls. Precise and sensible model portraying far field dissemination is critical for shaft changing an outline and testing procedure of light way structure of high diode laser frameworks has been carried out.

The innovation of LD laser pillar molding has incredibly advanced laser transmission of welding of plastics market on an awesome degree by a wide margin. Uniform line-source laser delivered by micro lens exhibit (MLA) is reasonable for cover welding while for form welding and semi synchronous welding M of laser spots can ensure the homogenization of the temperature appropriation along weld joint introduction during the time Force conveyance state. Systematic approximations for the far-field appropriation of LD have been researched widely which the far-field conveyance of low power (<1w) twofold hetero structure GaAlAs gadgets working in the central mode was a noteworthy angle by the specialist for example astigmatic elliptic Gaussian model, waveguide Gaussian model [4],

DOI Number: 10.5958/0976-5506.2018.00673.3
exponential Gaussian model and exponential hermite-gaussian model in l-cystine dihydrobromide.

MODELING AND EXPERIMENTAL VALIDATION

The fundamental driver of bi peak far-field conveyance is hitler kilter rectangular waveguide, as appeared in Figure 1, for the single producer high-control LD. From the Helmholtz condition by utilization of limit condition and rearranged to scalar diffraction vital expression arrangement of bi peak far-field appropriation of high power diode laser, under sensible approximations can be understood. For saving energy in laser source energy efficient voltage conversion range of multiple level shifter design in multi voltage domain \cite{5, 6} is necessary. Every reliant on just a single of the two transverse directions (x or y) can be communicated between two capabilities which leads to limited condition in optical field appropriation of the mode field of the LD’s inside waveguide on the feature. The principal mode exists toward the path opposite to the intersection plane, for the presence of multimode high power yield, the emanating zone is reached out to a stripe of 200~300¬m toward the path parallel to the intersection plane which is in light of dynamic layer of a micron that is altogether smaller than the wavelength. Two Gaussian functions the mode field toward this path parallel to the intersection is made.

\[ u(x', y') = u_2 \exp(-\frac{x'^2}{\sigma^2}) \exp(-qy^2 + ik_2y') \]  \(1\)

Figure 1: The waveguide structure of LD and De centered Gaussian modes

The far-field can be considered as the superposition of the forces of the two modes: Due to the two de centered Gaussian capacities having arbitrary worldly stage distinction

\[ \mathfrak{g}(x, y, z) = \left| \mathfrak{d} \right|^2 \exp \left[ \frac{-x^2}{\sigma^2} \right] \exp \left[ \frac{-y^2}{\alpha^2} \right] \exp \left[ \frac{-z^2}{\Omega_1^2} \right] \]  \(2\)

Figure 2: Reminding divergence with different defocusing amount

RESULTS AND DISCUSSIONS

In a Gaussian estimate with taking fiber as collimator the Figure 2 shows the connections between defocusing sum and reminding difference (95% of aggregate vitality). To accomplish least disparity the circular variation drives presence of certain defocusing ads up. In state of the best defocusing sum, the reminding uniqueness is fundamentally the same, 2.68e, utilizing optical filaments with various width.

CONCLUSIONS

For key purpose of further application the difference half-edge of around 0.2854° can be acquired in state of the best defocusing high power semiconductor laser which is depicted for far-field dispersion of figure 6. The collimation properties of high power diode laser pillar through tube shaped viewpoint in broke down by beams following in the quick pivot and moderate hub, individually the module of high power semiconductor laser is investigated and checked. Under the direction of this paper, a yield of 101.68w was acquired from 105m/0.15NA fiber in 976nm module with a coupling productivity of 85% and a brilliance of 16.63MW•cm-2•str-1. Such shine levels would fulfill the necessities of high-power fiber lasers as pump source.

Ethical Clearance- Taken from AMET University committee

Source of funding- Self

Conflict of Interest – Nil
REFERENCES


Dynamic Model For Gathering Target Estimation
Using Graph Theory

C Periyasamy

Assistant Professor, Department of Mathematics, AMET University, Chennai

ABSTRACT

There is a consideration for numerous resolvable that gathers target estimation under mess condition. During the process initial assembles the structure for the resolvable gathering targets utilizing chart hypothesis. Gathering estimation includes two phases of the objective state estimation and gathering state (assemble measure, shape, and so forth) estimation. The quantity of focuses by utilizing the multi-Bernoulli channel under the presumption of autonomy of all objectives which determines the objective assessed state set in view of the given gathering dynamic models. The estimated structures basically reflect the structures of the true subgroups. In second stage graph theory with group targets and build up of adjacent matrix of estimated state set can be combined. Number of subgroups, group state, group sizes and its structures can be got. To verify the proposed algorithm a linear and non linear examples are given.

Keywords: Multiple resolvable group targets, random finite set, graph theory, multi-bernoulli filter

INTRODUCTION

Much consideration of late is given to gather target. The primary reason is because of the quick advancement of new sensor innovation, rich data gathered from targets are bought in. It is notable that an objective is thought to be a point source called a point source target in customary radar following group. The objective is normally appeared as a point source on radar screen since it is kilometers away as a restricted capacity of discovery. With advanced sensor technologies being progressing higher resolution and more sensitive capabilities can be available. Modern infrared sensor using superconductive technology may receive shape information from a target. This means that multiple measurements may be got from a point source target. Tracking and data association under one target one detection assumption is no longer applicable [1].

Group target tracking in the classic Bayesian framework [2] was proposed; Koch imported the concept of unresolved target to the best knowledge of authors. To show the shape of group targets a key conception of symmetric and positively definite (SPD) described by random matrix is being adopted. The SPD is essentially an ellipsoidal shape [3]. The center issue of the examination is to appraise the arbitrary network from the estimations that has been got [4]. The move thickness of the objective augmentation (shape) is with Wishart dissemination, refreshed expansion can be approximated by a transformed Wishart conveyance, it has been demonstrated that if the earlier appropriation of an irregular lattice is accepted to take after reversed Wishart related dispersions. Further work focuses on nonellipsoidal extended target by combining of multiple ellipsoidal sub-objects (targets) where each target is represented by arandom matrix [5]-[7]. Baum et al described the extended target using the random super-surface model. E. Richter et.al. Tracks multiple extended target using Markov chain Monto Carlo approaches [8].

There are subgroups (in a major gathering) utilizing multi-Bernoulli RFS separating calculation and chart hypothesis [9]-[10]. One arranges the gathering target issue into target estimation and gathering estimation where the objective estimation incorporates the quantity of focuses on individual target states, gathering estimation incorporates the quantity of subgroups, the states, the sizes and the structures of individual sub graphs. A discrete time retrial inventory system with d-map demands has been described in [11].
BACKGROUND

The multi-target multi-Bernoulli (MeMBer) recursion was first proposed by Mahler in reference [2]. To reduce the cardinality bias, suggested a novel multi-Bernoulli approximation, called cardinality balanced multi target multi-Bernoulli (CBMeMBer) recursion, to the multi target Bayes recursion. The key point of the CBMeMBer filter is that the Bayes posterior can be approximated by a multi-Bernoulli RFS. That is,

\[(Xk−1|Z1:k−1) \approx \{(i)−1, p(i−1)k \}_{Mk−i=1}\]

(1)

Where \((i)−1, p(i)k−1\) are the parameters for the \(i\)th target in RFS \(Xk−1\).

Structured issue arisen in group target estimation has a very close connection with the graph theory which provides a theoretic basement to deal for group target tracking problem. Related background of graph theory has been briefed in section. A graph, at time \(k\), consists of a pair \(Gk=(Vk, E_k)\) where \(V_k=\{v_k, 1, \ldots, v_k, N\}\) is the set of vertices. \(E_k=V_k \times V_k\) contains the edges of the graph, which represent the dependence between two vertices. Set of neighbors of vertex \(v_k, \in V_k\) by \(N_k=\{v_k, \in V_k | (v_k, i, v_k, j) \in E_k, i \neq j\}\) is also defined. A basic diagram has a graph without any circles and no numerous edges. The edges of a straightforward diagram can be spoken to as an arrangement of two component sets [4]. Diagram \(Gk\) is a basic graph and has no circles although. A diagram can be arranged into the undirected chart and coordinated diagram (diagraph), individually as indicated each edge has an allotted introduction.

DYNAMIC MODELS FOR GROUP TARGETS

Graph theory gives an intense device to depict the reliance amongst vertices and it has been effectively utilized as a part of arrangement control of flying vehicles [5]-[6] and multi agent framework control [7]. Chart hypothesis with gathering targets and characterize the gathering focuses with graphical structure \(Gk\) as takes after has propelled by the achievement to join the chart.

Definition 1: Given group targets with fixed number of targets \(Xk=\{x_k, 1, \ldots x_k, Nk\}\) at time step \(k\), the group targets with digraph structure \(Gk=(V_k, E_k)\), where vertex set \(V_k\) is given by \(Xk\), i.e., \(V_k \triangleq Xk\). The edge set \(E_k\) is defined by the dependent relation between the vertex set \(E_k \triangleq X_k \times X_k\).

Remark 1: The structure of group targets can be seen as kinds of digraph. Specifically, according to their collaboration relationship, some vertices (targets) are parents and some are children. Besides, the group targets \(Xk\) may involve multiple subgroups with different structures. We analyze the structure \(G_k\)

EXPERIMENTAL RESULT AND DISCUSSION

For the group, consider the target’s labels, subgroup shape, and the number of subgroups as shown in Figure 1. Target labeled 8, which belongs to group 3, survives in three intervals [30s, 60s], [63s, 84s] and [88s, 100s]. In each step estimated number of subgroups and their structures after getting the individual states of targets under independence condition considering group targets’ birth and death defined aforesaid. Estimated group structures are randomly selected from scans 25s, 50s, 75s and 100s in an experimental running and are shown in Figures 2(a) to 2(d). The estimated structures basically reflect the structures of the true subgroups. For examples, Figure 2(b) at time step 50, first one has to derive 10 state set \{\(\hat{x}1, \ldots, \hat{x}10\)\}. Note that in each scan the sequence of the states are varied. Through estimating the group, we derive three subgroups and individual states of targets, where estimated state set \{\(\hat{x}1, \hat{x}2, \hat{x}4, \hat{x}7\)\} belongs to subgroup 3, and estimated state sets \{\(\hat{x}3, \hat{x}8, \hat{x}10\)\} and \{\(\hat{x}5, \hat{x}6, \hat{x}9\)\} belong to the other two subgroups 1 and 2 respectively.

![Figure 1. The true surviving process of targets in three subgroups against time](image-url)
CONCLUSION

One considers various resolvable gathering target following. The proposed calculation includes the objective estimation, as well as the gathering estimation. Unique in relation to the past work everyone has to concentrate on the accompanying perspectives: to start with, fabricated the dynamic model for the resolvable gathering targets in view of the diagram hypothesis. Second, in the RFS system, join the diagram hypothesis with the gathering targets and consider the quantity of the sub-aggregate in the gathering focuses under the jumbled condition.

Ethical Clearance- Taken from AMET University

Source of Funding- Self

Conflict of Interest – nil

REFERENCES


7. Baum M, Hanebeck UD. Shape tracking of extended objects and group targets with star-convex RHMs. In Information Fusion (FUSION), 2011 Proceedings of the 14th International Conference on 2011 Jul 5 (pp. 1-8). IEEE.


Sequential Quadratic Programming Optimization Method Used Cutting-Stock Problem

M Sudha

Assistant Professor, Department of Mathematics, AMET University, Chennai

ABSTRACT

In manufacturing of textile, leather, paper, ship building, and sheet metal industries cutting-stock problem is an important issue in operations research. Specific profiles on the material with minimum material wasted due to problem being arranged. Utility rate and reduce the cost of the stock can be increased. Base material may also be irregular when using the remainders of the last cut which has irregular profiles in the leather industry. Problem is formulated as a constrained optimization problem and solved by the Sequential Quadratic Programming (SQP) method. For multi stock problem global optimization algorithm is proposed to avoid local minimum point. An optimization model can be defined, SQP algorithm can be used to solve problem. Strategy can consider not only irregular stock but multi-stock as well. Four representative patterns are used to test proposed algorithm. Comparing to Genetic Algorithm, Sequential Quadratic Programming method really improve utility rate of stock.

Keywords: cutting-stock problem, global optimization, operations research, Sequential Quadratic Programming

INTRODUCTION

Cutting-stock problem is a problem that considers how to arrange a component of products in the stock without overlaps. It will enhance the stock utility or reduce the necessary stock. Problem of this nature is called as “packing problem” or “nesting problem”. The main purpose of this problem is reducing the material cost. In manufacturing of textile, leather, paper, ship building, and sheet metal industries the cutting-stock problem is an important issue. Fig.1(a) shows a 2D irregular data set “SWIM” from the textile industry. Fig.1(b) shows the best arranging pattern of “SWIM” by this paper.

Fig.1. Data set “SWIM”

According to different characteristics of objects, such as the profile, the number, and their orientation cutting-stock problem can be classified. This problem can be treated as mass production in which same objects will be cut from the selected material if object number is considered. Customized products or sample products may be manufactured for a small run. There should be many objects with different profiles in these problems. Therefore problem is more complex for a small run than in the mass production.

Cutting-stock problem can also be categorized by the characteristics of the stocks. The stocks of the leather industry are always irregular. While profile of the remainder materials is usually irregular remainder materials of the last cut can be used for saving material cost. The cutting-stock problem thus will have several different stocks. Such as ship industry there will be several stocks in some industries that produce large objects. Problem with a rectangular infinite length stock is less complex than cutting-stock problem with irregular stocks.

Problem is formatted as an optimization problem with inequality constraints. Sequential Quadratic Programming (SQP) method is used to solve this problem. For multi-stock problem which is helpful for global optimization algorithm is also proposed to avoid the local minimum point.
LITERATURE REVIEW

For cutting-stock problem clustering-then- nesting strategy has been proposed \cite{4}. For arranging of all objects of a product Sliding Technique \cite{5} has been used. Genetic Algorithm to arrange the orientation and position of the objects it is used \cite{6}. The “no-fit polygon” is defined in \cite{7} to acquire the nearest position between two objects. A “bottom-left strategy” is also used to organize the objects in a stock. Positions of the objects in a stock are changed to generate a new orientation based on the original solution described in \cite{8}. These methods can be used to solve the cutting-stock problem when objects should be arranged in a special orientation, because object orientation is fixed when finding the no-fit polygon \cite{3}.

To solve the cutting-stock problem an artificial neural network and the Genetic Algorithm are applied by Poshyanonda and Dagli \cite{9}. Objects in the stock are treated as binary matrices for easy formulation. \cite{10} used as an evolutionary algorithm with a fitness function similar to the Genetic Algorithm. In order to avoid local minimum traps some operators are also combined with algorithm. \cite{11} Codes the irregular stock and objects as an integer array. Cells that can arrange an object on it are coded as 0. Cells are coded as an integer number that starts at 1 from the cell at the farthest right. Objects are coded in the opposite way and are arranged near the bottom of the stock as close as possible. Integer numbers are helpful for increasing the speed of finding the optimum arrangement. Method for searching a good arrangement sequence is Genetic Algorithm coded with stock number, object number, object orientation. \cite{12} Uses one of method to design software for leather nesting.

Therefore here it proposes a strategy to consider irregular profile of the stock. Cutting-stock problem with irregular stock can be solved with SQP method. For irregular stock but multi-stock one can consider a particular strategy. For global optimization strategy that will be more suitable than the swap strategy in multi-stock problem proposal has been given. Mobile ad hoc networks (MANETs) are used widely for applications that need mobility while routing, more significantly for emergency and military operations in modern days. Identifiable Route Retrieval for Multicasting in MANETS is implemented. One of greatest challenges is Routing information to nodes without a permanent infrastructure and with dynamically changing infrastructure. Multicasting is a more frequent requirement for such protection operations, which adds on to level of difficulty while routing \cite{19}.

METHOD

Coordinate system of the stock is shown in Fig. 2. $x_i$ is x-coordinate value of the reference point of object $i$; $y_i$ is y-coordinate value of reference point of object $i$; $\theta_i$ is orientation of object $i$ \cite{13}. Origin is on bottom-left vertex of the stock. Every object is presented as a polygon. Reference point $(x_i, y_i)$ of object $i$ is represented in stock coordinate system and can be calculated by:

$$x_i = \frac{1}{V_n} \sum_{j=1}^{V_n} x_j$$

$$y_i = \frac{1}{V_n} \sum_{j=1}^{V_n} y_j$$

Where $V_n$ is the vertex number of object $i$.

![Fig. 2. The coordinate system relation of a stock and an object.](image)

Design variables: $x_{it}, y_{it}, \theta_{it}$ where $i=1$ to $n$

Cost function:

$$\text{minimize } f = \sqrt{\sum_{i=1}^{N} x_{it}^2}$$

Constraints:

$$g_{1i} = -\sqrt{(x_j - x_k)^2 + (y_j - y_k)^2};$$

$i=1$ to $N(N-1)/2$, $j=1$ to $(N-1)$, $K=(j+1)$ to $N$.

$$g_{2i} = -x_{it} \leq 0; \ i=1 \text{ to } N.$$

$$g_{3i} = -y_{it} \leq 0; \ i=1 \text{ to } N.$$

$$g_{4i} = -y_{it} \leq y_{it}; \ i=1 \text{ to } N.$$

From definition of cost function, these objects will be arranged near the boundary of stock as close
as possible. g1i constraint considers overlap of these objects. g2i, g3i, and g4i constrains avoid objects being arranged outside boundaries. Gradients of cost function and all constraints are necessary in search strategy. It will be calculated by finite difference method as follows [11]:

$$\frac{\partial f}{\partial x} = \frac{f(x + \Delta x) - f(x)}{\Delta x}$$

$$\frac{\partial g}{\partial d} = \frac{g(d + \Delta d) - g(d)}{\Delta d}$$

Where x is vector form of x-axis of all objects; d is vector form of the design variables (xi, yi, θi). After optimization problem is defined, it can be solved by SQP algorithm. Procedure of SQP algorithm can be divided into a “search direction finding sub-problem” and a “step size finding sub-problem” in iteration. Therefore, it is an iterative process until the optimum solution is found.

In SQP algorithm, Lagrange function is used for Karush-Kuhn-Tucker (KKT) where conditions must be defined as follows [14]:

$$L(f, g_i, u_i) = f + \sum_{i=1}^{4} (u_i \times g_i)$$

RESULTS

Four representative patterns (Dagli [15], Swim [16], Albano [17], and Blaze [18]) from ESICUP (EURO Special Interest Group on Cutting and Packing) website are selected for tests. Table I shows the results of using the SQP algorithm. It is obvious that the utility rates of stock are better than using Genetic Algorithm. Fig.3 shows best arranging patterns of problem with rectangular stocks.

DISCUSSION

Cutting-stock problem is treated as a standard optimization problem. Design variables, including position and orientation of object, are defined first. Its cost function is material utility rate, and constraints are the escape of objects from stock and overlap between objects. An optimization model can be defined, SQP algorithm can be used to solve problem. Strategy can consider not only irregular stock but multi-stock as well. Four representative patterns are used to test proposed algorithm. Comparing to Genetic Algorithm, Sequential Quadratic Programming method really improve utility rate of stock.

CONCLUSION

In manufacturing of textile, leather, paper, ship building, and sheet metal industries cutting-stock problem is an important issue in operational research. Expense of stock materials is critical to product cost. To enhance stock utility will help manufactures to reduce outgoings in these industries. Review of literatures shows that Genetic Algorithm or Simulated Annealing Algorithm are usually used to solve problem. Cutting-stock problem is treated as a standard optimization problem. Design variables, including position and orientation of object, are defined first. Its cost function is material utility rate; constraints are mainly to escape objects from the stock and overlap between objects. SQP algorithm can be used to solve problem for an optimization model that can be defined. Strategy can consider not only irregular stock but multi-stock as well. Four representative patterns are used to test proposed algorithm. Comparing to Genetic Algorithm, Sequential Quadratic Programming method really improve utility rate of the stock.

Ethical Clearance- Taken from AMET University

Source of funding- Self

Conflict of Interest – Nil

REFERENCES


19. Amarnath T, Divya V. IDENTIFIABLE ROUTE RETRIEVAL FOR MULTICASTING IN MANETS.
Algorithm for the Solution of ODE and PDE using Genetic Programming And Automatic Differentiation

S Meher Taj
Assistant Professor, Department of Mathematics, AMET University, Chennai

ABSTRACT

Capability of transformative calculations created by blend of hereditary programming and programmed separation techniques, in deciding explanatory answers for normal and fractional differential conditions is researched. AD is an arrangement of procedures in light of mechanical utilization of fasten run to numerically assess subordinate of a capacity determined by a PC program. AD technique has a key part since it ascertains correct estimations of subsidiaries of a capacity for a given arrangement of information esteems while numerical separation strategies present unsatisfactory round-off mistakes in the discrete procedures. With this reason, and utilizing Matlab programming condition a few calculations and tended to issues of various types of differential conditions were built up. Outcomes are promising, with correct arrangements are got for majority of tended to issues which incorporate conditions were not in any case business frameworks could locate a typical arrangement. Outcomes observationally show that GPAD can be a proficient and powerful strategy to discover diagnostic answers for ODE and PDE.

Keywords: - ODE, PDE, GPAD, automatic differentiation technique

INTRODUCTION

A critical number of research tasks, completed in various ranges of logical learning, make utilization of numerical models somewhat or completely defined by differential equations with genetic programming is explained by [1]. Be that as it may, given unpredictability of proposed models, their creators are regularly confronted with troublesome issues and obscure logical arrangements. Typical strategy is to get an answer by numerical techniques. Nonlinear control systems by means of differential genetic programming are discussed by [2]. Numerical arrangement is not adequate to totally give scientists appropriate responses required for their evaluations. Learning of arrangement in its exacting structure is fundamental since it permits accomplishing critical and diverse sorts of examines, for example, relative static; information of the size of halfway impacts; estimation of flexibilities; studies on security and stationary differential equation models by genetic programming and principles and techniques of algorithmic differentiation are described by [3,4]. Essential goal is to examine capability of developmental calculations, created by joining hereditary programming and programmed separation, in acquiring expository answers for customary and incomplete differential conditions [5]. Utilizing Matlab programming condition, one can build up calculations and a few issues with various types of ODE and PDE for testing. 20 conditions with explanatory arrangements known from the writing, and one whose investigative arrangement is obscure were tried. Later is PDE that depicts wave capacity of Schrodinger condition for helium molecule. Automatic differentiation is described by [6].

The after effects of the tests are promising since we got correct answers for every one of the 20 conditions with known arrangements while indistinguishably replicating the current arrangements. In spite of the fact that there is a tremendous writing on GP and AD, most research applies these systems independently to fathom differential conditions. GPLAB-a genetic programming toolbox for MATLAB is discussed by [7]. Likewise, those scientists who have created GP and AD together once in a while apply it to the arrangement of differential conditions. Among these works we highlight which filled...
in as a reason for correlation with assesses the execution of our calculations. Lexicographic parsimony pressure is discussed by [8]. Correlations were of major significance since they enabled us to seek after better outcomes and to grow more effective calculations, and with another approach. In General, Genetic algorithms based enhanced K Strange points clustering algorithm our outcomes are empowering by accomplishing careful answers for by far most of issues tended to, and demonstrate that the proposed strategy can be an effective contrasting option to comprehend ODE and PDE.

Automatic Differentiation

A PC program determines mechanical utilization of bind lead to numerically assess sub ordinate of a capacity which is programmed in a separation of an arrangement of systems in view. Regardless of how confused, executes a grouping of basic number juggling operation and basic capacities promotion misuses way that each PC program. Precise work accuracy and utilizing at most a little steady variable more math operations than first program subsidiaries of self-assertive request can be registered consequently by applying suffix administer more than once to these operations. The traditional techniques keep running into a few issues. Typical separation frequently prompts generally wasteful code and faces trouble of changing over a PC program into a solitary look, while numerical separation can present round-off mistakes in discrete procedure and cancelation. Both traditional techniques have issues with ascertaining higher subordinates, where many-sided quality and blunders increment. At long last, both established strategies are moderate at figuring fractional subordinates of a function of many contributions, as it is required for slope based or stochastic enhancement calculations. Promotion goes around these issues, to detriment of presenting more programming conditions.

Normally, two unmistakable methods of AD are displayed, forward mode (or forward collection) and turn around mode. Forward mode indicates that one navigates suffix run from inside to outside i.e. since for straightforward arrangement \( y = g(h(x)) = g(w) \) chain lead gives \( dy/dx = dy/dw \times dw/dx \), forward mode initially registers \( dw/dx \) and after that \( dy/dw \), while invert mode has traversal from outside to inside.

Methodological aspects of the Algorithm

Segment introduces methodological systems received for building up GPAD calculation, expounded with reason for taking care of issues of differential conditions. In any case, area is constrained to depict methodological perspectives identified with structure and operation of calculation steps. Calculation is created in Matlab programming condition and works with two essential codes working at same time. First is in charge of usage of hereditary programming, and second plays out programmed separation and assesses people’s wellness. Codes run a settled number of eras and play out accompanying strides: formation of introductory populace; wellness assessment of people; choice of people for propagation; generation and approval; survival and production of new populace. From initial step, which runs just in statement, rest of means are reheashed in all er as.

GP achieves is making underlying populace is initial step. Capacities and terminals are chosen and joined, beginning the people that make up the underlying populace. Each individual is a scientific expression spoken to as a tree and perhaps an answer of differential condition of intrigue. GPAD offers three techniques for choice of underlying populace, which are: Full, Grow, Ramped-cream. Grow technique in all applications displayed is demonstrated more productivity in handling time and create best outcomes, likely in light of fact that strategy creates tree with uneven and unbalanced configurations, which are most fitting to speak to numerical capacities. In second step, it is played out wellness assessment of people. It is important to characterize a blunder measure to assess execution of every person. In wake of examining measures usually utilized for this reason, to chose to work with mean supreme mistake between different conditions has got from capacity proposed by GP and differential condition of issue being referred to, in addition to punishments for missed confinements, for example, introductory conditions and limit conditions. As it were,

\[
\text{Fitness} = \text{MAE} + \text{confinements mistake. (1)}
\]

AD program has task of numerically affirm game plans proposed by GP program. AD programs myAD and myA2D made, which play out first and second demand subordinates of a limit, separately. Both AD programs work in forward mode. Finally, after acclimations to make these AD codes great with the GP code which gets united to GPAD. Next, direct case is to outline that how movement of functions is shown. Expect one need the plan of going with ODE issue:
\[ f(x) + 2f(x) = \exp(-2x) \quad | \quad x \in R, f(0) = 3. \]  

(2)

Suppose, also, that the function

\[ f(x) = 2 + \exp(-2x) \]  

is a GP individual and a possible solution to the problem.

Next step is to evaluate fitness of Equation 3. At this point, second code performs automatic differentiation and calculates derivative of \( f(x) \) at each point of domain defined by algorithm coming to:

\[ f'(x) = -2 \exp(-2x). \]  

(4)

Equations 3 and 4 are replaced into Equation 2 and proposed solution fitness is evaluated at each point. Symbolic expression of comparison is:

\[ f'(x) + 2f(x) - \exp(-2x) = 4 - \exp(-2x) \neq 0. \]  

(5)

One can notice that \( f(x) \) is not exact solution to Equation 2, because its error value is not zero. However, it satisfies initial condition, since

\[ f(0) = 2 + \exp(-2 \times 0) = 2 + 1 = 3. \]  

(6)

Algorithm does not work with symbolic differentiation, as shown before, but with automatic differentiation, where derivatives are applied and evaluated at every point of domain of the function. Error measure for this example is

\[ \text{fitness} = \frac{1}{n} \sum | f'(x_i) + 2f(x_i) - e^{-2x_i} | + | f(0) - 3 | \]  

(7)

Last stride approached performs is approval of best arrangement produced by GPAD calculation, as a last arrangement worthy to issue proposed. This progression is performed independently, outside programming condition. Thus, an answer will be approved as a last arrangement on off chance that it meets majority of accompanying prerequisites:

- fitness esteem < 10−8;
- satisfying the confinements and conditions set around the issue;
- When assessed by differential analytics rules, it must present a numerical expression indistinguishable to differential condition initially proposed.

In event that a last arrangement, approved by above necessities, accomplishes wellness equivalent to zero, it will be considered as a correct answer for proposed issue. Something else, this arrangement is considered as a surmised arrangement.

**RESULT AND DISCUSSION**

For all examples, solution obtained by GPAD in three different representations: symbolic; as a tree; and graphics are presented.

**Example 1**

The first problem addresses the solution of the following second order ODE:

\[ y''(x) + 0.3y'(x) + 25y(x) = 25.12 + 10x - 1.5 \cos(5x) \exp(-0.3x) \quad | \quad x \in R, \]  

(8)

Subjected to:

\[ y(0) = 1 \quad \text{and} \quad y'(0) = 5.4. \]

The solution obtained by GPAD to Equation 8 is

\[ y(x) = 1 + 0.4x + \sin(5x) \exp(-0.3x). \]  

(9)

Fig 1 demonstrates a tree portrayal for the Example 1 ODE arrangement, where X1 signifies variable x. GPAD found the correct answer for Equation 8 subsequent to assessing 6,031 people with a populace of 400 people and 40 eras. The tree is tightfisted, with a little profundity and a low number of hubs, which encourages perusing and translating the got work. This arrangement is correct in light of the fact that its wellness = 0, fulfills every single characterized requirement and, mostly on the grounds that it is indistinguishable to the proposed
issue ODE while applying differential analytics. Fig 1 demonstrates the chart of arrangement $y(x)$ (Equation 9).

![Fig.1. Tree representation and Graph of $y(x)$ for ODE Solution](image1)

**Example 2**

The second problem addresses the solution of the following second order ODE with variable coefficients:

$$x^2y''(x) + xy'(x) + 4y(x) = 6\sin(\ln(x)) \quad | x \in \mathbb{R}, x > 0,$$

Subjected to:

$$y(1) = 3 \quad \text{and} \quad y'(1) = 2.$$  

The solution obtained by GPAD to Equation 10 is

$$y(x) = 3\cos(2\ln(x)) + 2\sin(\ln(x)).$$  

Fig 2 shows a tree representation for the Example 2 ODE solution, where $X1$ denotes variable $x$. GPAD found the exact solution after 13,665 evaluations (best so far), with a population of 400 individuals and 50 generations. The tree is quite parsimonious, with depth 6 and 13 nodes. Figure 2 shows the graph of solution $y(x)$ (Equation 11).

![Fig.2. Tree representation and Graph of $y(x)$ for PDE Solution](image2)

**Example 3**

The third application solves the following second order PDE with variable coefficients:

$$xf_x + 2f_t = x \cos(x) + 2 \sin(x) \quad | (x, t) \in \mathbb{R}^2,$$

Where:

$$f_x = \frac{\partial f(x, t)}{\partial x} \quad \text{and} \quad f_t = \frac{\partial f(x, t)}{\partial t},$$

Subjected to:

$$f(0, t) = 0 \quad \text{and} \quad f(x, 0) = x^2.$$  

The solution obtained by GPAD to Equation 12 is

$$f(x, t) = x^2e^{-t} + t\sin(x).$$  

Fig 3 shows a tree representation for the Example 3 PDE solution, where $X1$ and $X2$ denote variables $x$ and $t$, respectively. GPAD found the exact solution after 4,823 evaluations (best so far), with a population of 600 individual and only 25 generations. The tree is parsimonious, with depth 6 and 12 nodes. Figure 3 shows the graph of solution $y(x, t)$ (Equation 13).

![Fig.3. Tree representation and Graph of $f(x, t)$ for PDE Solution](image3)

**CONCLUSION**

Exploration planned to research capability of transformative calculations, created through techniques for GP and AD, in acquiring answers for differential conditions issues. In light of got results, with correct answers for far most of tended to issues, target and proposed procedure is a possible option for getting ODE and PDE arrangements when trust is accomplished.
REFERENCES


Analyze the Probability Function Using Random Distribution Control Method in Nonlinear System

I Paul Raj Jayasimman
Assistant Professor, Department of Mathematics, AMET University, Chennai

ABSTRACT

To increase stability of non-linear system method, stochastic control method is proposed which works based on sliding mode control algorithm for shaping circuit design. Parameter of control method is informed at each sample time rather than using a group mode for Kullback–Leibler divergence that is established to random distribution control. Stochastic control method is used in continuous network in recent times. The method act as a continuous function even though actual controller has been discontinuous in switches. Parzen window technique is one of the generally utilized part estimators. It is nonparametric strategy to appraise the expression of an arbitrary procedure. An immaculate sliding mode is conceivable just on account of flawless model learning and without unsettling influences. Evaluated weight vector will join to its ultimate value while system will be asymptotically stable under rank-condition, which determines excitation form. Effectiveness of proposed algorithm is illustrated by simulation.

Keywords: Probability density function, sliding-mode control, random distribution control, Kullback–Leibler divergence

INTRODUCTION

Critical functional matter in controller configuration is minimization of irregularity in fasten circle system when managing with these random method. Stochastic analysis and control of real-time systems with random time delays is discussed by [1]. Mean output and difference under theory that system parameter is of Gaussian arrangements has been centered with Regular random control. Fuzzy controller design for non-Gaussian stochastic distribution systems using two-step fuzzy identification is described by [2]. Key ideal control techniques in stochastic control hypothesis, where straight frameworks and added substance white Gaussian commotion are expected using straight quadratic Gaussian (LQG) control which has been a standout. LQG issue can be illuminated by utilizing the division rule. Under uniform quantization and deception attacks through sensor networks are explained by Distributed recursive filtering for stochastic systems [3]. Late works incorporate prescient stochastic control, versatile nonlinear stochastic control what’s more, powerful fluffy control for questionable Markova stochastic frameworks. Vast majority of these methodologies are unsatisfactory for nonlinear frameworks with non-Gaussian commotion. Robust fault diagnosis and fault-tolerant control for non-Gaussian uncertain stochastic distribution control systems and Distributed fault estimation for time-varying systems with randomly occurring nonlinearities over sensor networks are explained by [4][5].

Seismic quickening procedure is characterized as a direct blend of deterministic capacities regulated by 10 uncorrelated arbitrary factors by this method. Fuzzy C strange points clustering algorithm is discussed by [6]. For concentrating on nonlinear arbitrary reaction of structures which are subjected to the outside excitation and the Fuzzy C strange points clustering algorithm recent probability density evolution method (PDEM) is utilized [7]. Generalized density evolution equation is derived first with regard to evolutionary probability density function of stochastic response for nonlinear structures which is totally uncoupled one-dimensional also overseeing partial differential condition in PDEM. Single Input Fuzzy Logic Controller Based SVC for Dynamic Performance Enhancement of Power Systems is described by [8]. Representation of sliding mode control based probability density function is shown in Fig 1.
Sliding mode controller

SMC is used in continuous network in recent times. SMC act as a continuous function even though actual controller has been discontinuous in switches which are across. Be that as it may, by and by most control frameworks are in truth PC controlled. Real shut circle framework can’t be crashed into genuine sliding mode which has a restricted exchanging recurrence along the sliding complex in a two time sliding mode with limited examining recurrence. An immaculate sliding mode is conceivable just on account of flawless model learning and without unsettling influences.

Probability density function

To evaluate likelihood thickness for example histograms, bit estimator, the closest neighbor strategy, orthogonal arrangement estimator, and most extreme punished probability estimator there are various strategies. To concentrate on the piece estimator in view of its wide pertinence and its connection between Renyi’s entropy and data difference here it is dealt with. Parzen window technique, which is one of the generally utilized part estimators, is a nonparametric strategy to appraise the expression of an arbitrary procedure.

\[ P_d(X) = \frac{1}{\sigma_d \sqrt{2\pi}} \exp \left( -\frac{X^2}{2\sigma_d^2} \right) \]

RESULTS AND DISCUSSIONS

Probability density function of s is shown in fig 2. Control input of proposed SMC, SMC+PDF and SMC+ASG is shown in fig 3. Output of proposed SMC, SMC+PDF and SMC+ASG is shown in fig 4. 3d mesh of sliding surface is shown in fig 5.
CONCLUSION

For nonlinear stochastic frameworks random dispersion control conspire is proposed. Pdf control shapes the sliding surface to a coveted pdf, SMC makes the framework stable in proposed controller. There are two noteworthy contrasts in pdf control part when contrasted with existing pdf plans. First is utilization of K–L difference for pdf control. In pdf control plans base square blunder (MSE) and MEE are utilized generally. MSE is just ideal for direct frameworks with Gaussian factors.

Ethical Clearance- Taken from AMET University

Source of Funding- Self

Conflict of Interest- nil

REFERENCES


Fatigue Analysis of Stiffened Plates Based on Accumulative Plastic Strain Model

M Sudha

Assistant Professor, Research Scholar, Department of Mathematics, AMET University, Chennai

ABSTRACT

Keeping in view of hypothesis of harm mechanics low-cycle weakness collective expanding plastic harm demonstrates and low–cycle weariness life which shows for hardened plates have been determined to break down the expanding aggregate plastic harm of ship solidified plate, brushing the association coefficient of stiffener and plate with plastic strain of harm advancement as the control amount. Weakness harm variable of solidified plate under cyclic stacking was brought into collective plastic strain condition. Development condition of hub aggregate plastic strain and constitutive model for low-cycle weariness life were concluded under low cyclic stacking was followed for necessary changes. Hypothetical development comes about because of exhibited models of aggregate plastic strain harm were contrasted and limited component displaying comes about when general high quality steel 402 was embraced. Outcomes shows setting up of models with well mirrors advancement law of pivotal plastic strain of hardened plate under cyclic stacking and is advantageous to assess low cycle weariness quality of ship structure.

Keywords: damage mechanics, stiffened plates, low cycle fatigue, accumulative plastic strain

INTRODUCTION

Coupling after effect of low cycle exhaustion harm and aggregate compliancy harm has been general disappointment for ship frame auxiliary. Conventional examination is primarily about high cycle weariness yet not low-cycle exhaustion. For issue of low cycle improvement of bigger ship structures and in additional visit marine mishaps in ship building industry exhaustion was paid on these accounts. In designing structure low cycle weariness is a typical disappointment frame. Frame structure harm brought about by low cycle weakness is not immediate rather gathering with time due to diverse impact and establishing. Until the frame structure disappointment break keeps on extending when minute split happens when the collected plastic strain come to a specific farthest point. Bat starts from negative imperfection and after that gathers and advances after weariness split right off. It’s a procedure of vitality dispersal. Chen and Liu called attention plainly after their arrangement has been investigated: “structure will be in disappointment and will prepare as plastic happening will be missing gathered or rehashed, it harmed under vast scale cyclic stacking. Comparing

breakage shape is individually expanding aggregate plastic distortion harm or cycle plastic shaping which is missing while in harm.” truth be told, expanding collective plastic disfigurement harm and cycle plastic twisting harm are not autonomous but rather coupling. Collective plastic harm has been

Expanding like plastic strain harm after each high anxiety abundance cycle, which prompts lose of material malleability. Strain gathering activity of plastic happening aggregates alongside expanding cycles which is missing.

Hardened plate is the essential part of ship and sea structures, and is generally utilized as a part of numerous other mechanical designing because of its light weight, high quality, and great split anticipation impact, among others. Collective plastic strain show for low cycle weakness examination of hardened plates is set up in view of harm mechanics hypothesis. With a specific end goal to assess precisely long haul steadiness and security of solidified plate under cyclic stacking, collective plastic strain hypothesis of hardened plate was proposed. Presenting exhaustion harm variable
of hardened plate under cyclic stacking into collective plastic strain condition, by methods for necessary change, pivotal aggregate plastic strain development condition of solidified plate under low cycle weariness cyclic stacking is determined.

THEORETICAL CONSIDERATION

Damage Mechanics Model

For vitality scattering low-cycle weariness harm is a procedure. Physical instrument of weariness harm is predictable with harm mechanics hypothesis. As indicated by [3-4], harm strategy is additionally a procedure of vitality dissemination. Dispersal qualities can be portrayed by a thermodynamic potential capacity $\psi^*$, which is called dissemination potential for harm stream potential. It’s one of the raised capacity about volume vitality thickness $Y$, and because of duality connection in thermodynamics and orthogonal stream manage of inside factor, one can know:

$$\dot{D} = \frac{\partial \psi'}{\partial Y}$$  \hspace{1cm} (1)

Where, $D$ is used to describe the microscopic damage variable of material. Relationship shows damaged evolution equation can be obtained as soon as dissipation potential is given. The dissipation potential can be expressed as:

$$\psi'(Y, p, T) = \frac{b}{S_y + 1} \left( \frac{-Y}{b} \right)^{\varepsilon - 1} e^{\varepsilon_m}$$
$$Y = \frac{\sigma^* R}{2E(1-D)}$$  \hspace{1cm} (2)

Where $R$ is tri-axial stress ratio, $E$ is elastic modulus, $D$ is microscopic damage variable, is material properties relying on temperature, $b$ is material constant, is accumulative plastic strain rate, $\sigma$ is applied uniform tension load. Substitute (2) into (1):

$$\dot{D} = \frac{\partial \psi'}{\partial Y} = \left( \frac{-Y}{b} \right)^{\varepsilon - 1} e^{\varepsilon_m}$$

According to effective stress concept in damage mechanics, can be written as:

$$\dot{\bar{\sigma}} = \frac{\sigma - \sigma}{1-D}$$  \hspace{1cm} (4)

Where, $\sigma$ is effective stress? Substitute (4) into (3), accumulative plastic damage mechanics model under monotonic loading can be obtained as:

$$\dot{D} = \left( \frac{\sigma^* R}{2\varepsilon E} \right)^{\frac{1}{2}} e^{\varepsilon_m}$$  \hspace{1cm} (5)

Accumulated Plastic Strain model for Stiffened Plate

Low cycle fatigue often occurs at cyclic loading of high level stress and large amplitude. Damaged mechanics model has been derived from (3). In one-dimensional, axial stress state. According to Ramberg-Osdood’s strain hardening rate, expression between plastic strain and equivalent stress is considered as follow:

$$\varepsilon_r = \left( \frac{\sigma}{K(1-D)} \right)^n - \left( \frac{\sigma}{K(1-D)} \right)^m$$  \hspace{1cm} (6)

Derivative of (7) can be obtained as:

$$\dot{\varepsilon}_r = \left( \frac{2}{3} \dot{\varepsilon}_p \varepsilon \dot{\varepsilon}_p \right)^{\frac{1}{2}}$$  \hspace{1cm} (7)

$$\dot{\varepsilon}_p = \varepsilon_p = \frac{m\sigma^{n-1}\sigma}{K^{m/(1-D)}^{2m}}$$  \hspace{1cm} (8)

Substitute (8) into (3), it can be estimated as:

$$\dot{D} = \left( \frac{\sigma^* R}{2E(b(1-D)^2)} \right)^{\frac{1}{2}} \cdot \frac{m\sigma^{n-1}\sigma}{K^{m/(1-D)}^{2m}}$$  \hspace{1cm} (9)

Some researchers have put forward an analytical expression containing parameter to express influence coefficient of plate strength from stiffener (8):

$$\dot{\bar{\sigma}} = \frac{\sigma - \sigma}{1-D}$$  \hspace{1cm} (10)
For angle-bar: \( d = 0.98 - 0.14(L/W) \);
For flat-bar: \( d = 0.12 - 0.02(L/W) \).

The mechanics damage model of low-cycle fatigue with stiffener is expressed:

\[
D = \left( \frac{\sigma R}{2Eb^k (1-D)} \right)^2 \cdot \frac{m \sigma^{n-1} \sigma}{K^m (1-D)^{2n}}
\]

Under cyclic loading, with effective stress amplitude instead of uniaxial stress \( \sigma \), the damage in a cycle can be expressed as

\[
\frac{\delta D}{\delta N} = 2 \left( \frac{\sigma R}{2Eb^k (1-D)} \right)^2 \cdot \frac{m \sigma^{n-1} \sigma}{K^m (1-D)^{2n}} d\sigma
\]

Where \( N \) is cyclic numbers and \( \sigma \) is effective stress amplitude. Assuming that there is no structure damage when \( N = 0 \) and the structure failed when \( N = \infty \):

\[
\int_{0}^{\infty} (1-D)^{2(n+1)} d\sigma = \int_{0}^{\infty} \frac{R}{2Eb^k (1-D)} \cdot \frac{2m \sigma^{n+1}}{K^m (m + 2S)} \cdot d\sigma
\]

Where, \( N_f \) is the cyclic numbers when the structure fails. The following expression of \( \sigma \) is therefore employed:

\[
N_f = \frac{(2 Eb^k)^{1/2}}{R} \cdot \frac{k^{n+1}}{2m (m + 2S)(m + 2S)} \cdot \sigma^{n+1}
\]

The low-cycle fatigue damage can be determined from (13) when the number of cycles is known:

\[
D = 1 - \frac{N}{N_f}
\]

Substitute (15) into (8):

\[
\dot{\varepsilon}_f = \dot{\varepsilon}_p = (1 - \frac{N}{N_f})^{-3} \cdot \frac{m \sigma^{n-1} \sigma}{K^m}
\]

Elastic deformation will be restored in process of unloading under cyclic loading \( [5] \), while irreversible deformation will be left behind. Axial plastic deformation in a cycle is equal to axial plastic strain in loading stage.

\[
\frac{d\varepsilon_f}{dN} = \int_{0}^{N_f} \frac{\sigma - \sigma^n}{K^m (1-N/N_F)} \cdot \frac{2n}{N_f} d\sigma
\]

\[
\int_{0}^{\infty} d\varepsilon_f = \int_{0}^{N_f} \sigma - \sigma^n \cdot \frac{2n}{N_f} \cdot \frac{N}{N_f} dN
\]

Then by means of integral transformation and considered the boundary condition, result can be got by

\[
\varepsilon_f = \varepsilon_p - \Delta \varepsilon_p (1 - \frac{N}{N_F})^{-3} \cdot \frac{2n}{N_F}
\]

Where \( \varepsilon_0 \) initial plastic is strain and \( \varepsilon_f \) is accumulative plastic strain. Accumulative plastic strain model of low cycle fatigue of stiffened plate under cyclic loading then can be written as:

\[
N_f = \frac{E_b}{K^m (m + 2)} \cdot \frac{k^{n+1} \sigma^{n+1}}{2m (m + 2S)(m + 2S)}
\]

Where \( \varepsilon_0 \) is initial plastic strain, \( \varepsilon_f \) is axial accumulated plastic strain when stiffened plate failed.

RESULTS AND DISCUSSION

Fig.1.Finite Element Mesh Model

Fig.2.Accumulative Plastic Strain

Harm variable is an inside state variable portraying mechanical property and harm advancement of material. Harm variable can’t be measured specifically and ought to be characterized through other full scale parameters, to be specific within harm parameters. Existing examinations have demonstrated cyclic plastic distortion and its aggregation being essential reason of weakness harm. Plastic strain vitality being a vital parameter depicts exhaustion harm. Cyclic plastic
strain vitality can exhaustively mirror impact of cyclic anxiety strain and transient impact of material’s cyclic solidifying and softening. Cyclic plastic strain vitality to characterize harm variable for its unmistakable physical implications, as well as it can mirror impact of material’s non-straight impact on harm advancement in each cycle. Plastic strain vitality consumed by material in each cycle levels with region of relating stress-strain bend. Strain being capacity of dislodging, can be portraying plastic strain vitality with stretch strain bend.

CONCLUSION

A nonlinear course based PFA for bi-static geometry considers keep up a key package from range related as well as with sees space-independent range affirmation. As course based PFA sees decided zone which has being asked for, SAR pictures can be more understood and isolated. While transmitter staying at a secured standoff division can be stunningly made, picture processor of pro can be gained ground.

Ethical Clearance- Taken from AMET University

Source of Funding- Self

Conflict of Interest - Nil

REFERENCES

Transmission Line Applications Using with 2-D Numerical Inverse Laplace Transforms

C Periyasamy

Assistant Professor, Department of Mathematics, AMET University, Chennai.

ABSTRACT

Constant space-time frameworks, for example, transmission lines (TL) with appropriated parameters, are ordinarily portrayed by straight 2D fractional which differs from present conditions, and henceforth in these cases it is extremely difficult to get space-time reaction logically, which draws out significance of using numerical strategies. Three 2D Numerical Inverse Laplace Transform (NILT) strategies are introduced, which have ability of recovering space-time reaction in one single figuring step. Choose 2D-NILT techniques, which are formulated in light of either Fourier arrangement or Pad estimate, are executed which are tested using MATLAB condition. Numerical techniques are inspected by utilization of important test works in Laplace area with pre-known firsts. Furthermore, 2D-NILT techniques results are examined from an electrical designing perspective to watch their execution with respect to their precision, all inclusiveness and security. There will be a utilization of these 2D-NILTs freely on a transmission line depicted by a Laplace show.

Keywords: Transmission Line (TL), two dimensional, numerical, Numerical Inverse Laplace Transform (NILT), FFT

INTRODUCTION

In a wide field of utilizations of physical intrigue, Laplace changes are utilized, and for particular issues arrangement are once in a while communicated by various capacities where inverses can’t be upset by standard procedure of utilizing reversal tables because of deficiencies of two dimensional polynomial factorization hypotheses. Inverse of 2-D Laplace transforms applied to fractional differential equations has been explained by [1]. Need of utilizing two-dimensional numerical Laplace changes and their applications emerge, with goal to acquire effective eccentric strategies for unravelling scientific models of interconnects. Improved method of numerical inversion of two-dimensional Laplace transforms for dynamical systems is described by [2]. Numerical reversals of Laplace changes of one variable are emphatically are presented in writing; all these are considered, a great deal with less consideration has been paid on two-dimensional changes, just a couple of techniques are accessible in literature, which draws out need to relate and contrast these strategies together with have capacity to have a general diagram and to stress potential techniques for further improvement. Two approaches to derive approximate formulae of NILT method with generalization and An improvement of FFT-based numerical inversion of two-dimensional Laplace transforms by means of epsilon-algorithm are discussed by [3,4]. Two dimensional reversal techniques and their benefits are introduced alongside their exactness examinations and after use of strategies on transmission lines with appropriated parameters.

MATHEMATICAL MODELS OF 2-D NUMERICAL INVERSE LAPLACE TRANSFORMS

To present main definition of the two variables Laplace transformation equation, described by following double integral,

\[ F(s_1, s_2) = \int_0^\infty \int_0^\infty f(t, x)e^{-s_1 t - s_2 x} dt dx \]

with its corresponding inverse Laplace integral,

\[ f(t, x) = \frac{1}{(2\pi j)^2} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} F(s_1, s_2) e^{s_1 t - s_2 x} ds_1 ds_2 \]

Here \( j = \sqrt{-1} \) is the imaginary number, \( c1 \) and \( c2 \) are real constants greater than abscissa of absolute convergence of \( F(s_1, s_2) \). Symbols \( t \) and \( x \) can be generally
any two independent variables, though due to interest in engineering related applications, one can consider to be in time and space variables respectively. First two methods described are devised by two different approaches which are based on Fourier series. A fast computing method of numerical inversion of two-dimensional Laplace transforms using FFT algorithms and Error analysis and optimal parameter evaluation in FFT-based 2D-NILT method are discussed by [5,6]. Generally, FFT algorithm approximations of series are considered by researchers to be among fast computational methods; nevertheless, these two methods were significantly improved by use of accelerating algorithms, which are described in following sections. Numerical inversion of two-dimensional Laplace transforms are based on partial inversions and Numerical inversion of multidimensional Laplace transform which are described by [7, 8]. Third method is based on Zakians 1D NILT and uses Pade approximation for representing the exponential kernel (es1t, es2x), of Laplace definition integral (1), and then with help of residue calculus to obtain final inversion algorithm. Multiband Wavelet Analysis is presented in [9]. Multiband Wavelet analysis significantly reduces the number of sub band filters required. Method has well down sampling rate thereby reducing the resolution of output image by a large factor. Hence sub band image occupies less space.

ACCELERATED FFT-BASED 2D NILT

Method denoted as (FFT-based epsilon 2D-NILT), has been developed originally by applying trapezoidal rule of integration into definition integral (2), with specific frequency steps given as \( \Omega_i = \frac{2\pi}{N_i T_i}, i = 1, 2, \) and by considering original at discrete points \( t_i = r_i T_i, r_i = 0, 1, N_i - 1 \) where \( T_i \) are sampling periods in real time domain. With suitable approximation of inversion algorithm and basic assumptions shown in [4] we get,

\[
\tilde{f}_{k1,k2} = C^{k1,k2} \left\{ 2\text{Re} \sum_{n1=0}^{\infty} \sum_{n2=0}^{\infty} F_{-n1,-n2} E_{-n1}^{k1,k2} - \sum_{n1=0}^{\infty} F_{-n1,0} E_{-n1}^{k1} - \sum_{n2=0}^{\infty} F_{0,-n2} E_{-n2}^{k2} \right\}
\]

Where \( \tilde{f}_{k1,k2} = \tilde{f}(k1T1, k2T2) \), is discrete form of approximate formula. Function symbols in Equation (3) are given as follows, \( F_{n1,n2} = F(c1 + jn1\Omega1, c2 + jn2\Omega2) \), with \( E_{k1,k2} = \Omega1\Omega2\pi2 ec1k1T1+c2k2T2 = Ck1Ck2 \), such that \( s_i = c_i + j\omega_i \). An improved choice of parameter \( c_i \) for best results is \( c_i \approx \alpha_i - \Omega_i^2 \pi \ln E_l, i = 1, 2, \) where \( E_l \) is a desired relative error. Infinite sums in Equation (3) are calculated using up to \( N_i - 1 \) terms by FFT algorithms, where \( N_i \) is a free parameter which could be optimized for best results. By performing several tests it is shown with optimal number of terms used for evaluation of FFT algorithm were 512 terms. Furthermore, remaining terms above \( N_i \) terms are integrated with \( \epsilon \)-algorithm to accelerate convergence and increase accuracy. Geometric optimization of HOMO and LUMO energy, molecular electrostatic potential, NMR, FT-IR and FT-Raman analyzes on 4-nitrophenol has been explained.

APPLICATION OF 2D NILTS ON DISTRIBUTED SYSTEM

Approach of applying 2D NILTs on transmission lines (TL), see Figure 1, essentially it has been executed as takes after applicable transmitted conditions which are numerically depicted by incomplete differential conditions are changed by utilization of 2D Laplace change concerning both time \( t \), and to geometric arrange \( x \), to get completely arithmetical conditions. At a point 2D-NILT strategies are utilized autonomously to tackle transient marvels on transmission line by a solitary estimation step and thus, getting voltage/current dispersions along TL wire, shown in a 3D plot in Figure 2.
RESULT AND DISCUSSION

Results of voltage distributions are shown in Figure 3, bearing in mind current distributions along line can be similarly obtained in one step by 2D NILT methods. By analysing results, it can be noticed when absolute errors are generally very accurate with an average of $10^{-8}$. Mainly, results of first two methods are accurate and stable for smooth functions or functions with discontinuities, such as test function F2, shifted step function. Third method, Singhal 2D NILT, gives relatively very high accurate results for smooth functions, but not so efficient when applied to functions with discontinuities, which will be in case of function F2, where Gibbs effect are clearly noticed near discontinuities of function.

CONCLUSION

Here it has been outlined 2D NILT techniques and picked delegate strategies and actualized them in Matlab dialect to look at their precision, assess their efficiency and afterwards apply these techniques on transmission line with circulated parameters. After effects of voltage appropriation along TL were efficiently acquired by utilization of 2D NILTs. From outcomes and tests played out, the FFT Qd 2D NILT strategy is for most part prescribed, because of its high precision and general strength of remainder difference calculation, for further improvement and applications in electrical...
designing field and particularly on ceaseless space-time frameworks.

**Ethical Clearance**- Taken from AMET University

**Source of Funding**- Self

**Conflict of Interest**- Nil

**REFERENCES**


GPS Signal Anti-Jamming Assisted with Probability Statistics based on Frequency-Space Domain

P Palanichamy
Assistant Professor, Department of Mathematics, AMET University, Chennai

ABSTRACT

Global Positioning system signal is frail and powerless. Scoring channel fell with space channel can enhance counter sticking capacity of GPS beneficiary can utilize recurrence area. It is hard to identify the narrowband sticking goads effectively by quick Fourier change when narrowband sticking falls in wideband. Likelihood insights calculation is proposed to help distinguish narrowband obstruction area in recurrence range. It’s valuable to utilize likelihood insights recurrence area separating calculation to check irregular flag. Since narrowband obstruction might be submerged in broadband impedance a timeframe so it is elusive narrowband impedance tops in a few casings after FFT changing. It is demonstrated, both spatial and transient marks of signs impinging on multi-sensor recipient accept comparative parts in collector execution. Spatial and transient marks’ separate connection coefficients show up as square multiplicative items in SINR articulation. Numerical outcomes demonstrate proposed calculation which performs well.

Keywords: - spatial filtering, frequency filtering, anti-jamming, probability statistics

INTRODUCTION

A Global Positioning System is a satellite-based, all-climate and constant route and situating framework. Past its unique military reason, GPS has been broadly utilized as a part of assortment of regular citizen applications [1]. GPS flag has been feeble and powerless. Power thickness occurrence on a GPS collector reception apparatus is about - 133dBW/m2 [2]. Since GPS collector receiving wire couldn’t have high pick up for the field of view necessities, in which flag is about - 160 dB, which is lower than warm clamour level [3]. Such powerless signs are famously simple to stick either by purposeful impedance or inadvertently one. During wartime electromagnetic condition is exceptionally perplexing; one can use spatial separating calculation, space time calculation, spatial-recurrence calculation and different calculations for hostile to sticking preparing when wideband impedance exists together with narrowband obstruction [4]. Basic spatial shifting calculation can all while channel narrowband impedance channel and wideband obstruction; however narrowband impedance can possesses exhibiting receiving wire impedance’s opportunity which can decrease quantity of obstruction [5]. Space-time versatile handling separating strategy is many-sided quality and should be lessened rank and measurement [6]. Spatial-recurrence calculation, recurrence space sifting calculation can distinguish narrowband impedance after FFT change and afterward channel it. Space separating calculation channels wideband obstruction at a particular point. Along these lines, much obstruction can be sifted [7]. When wideband obstruction coincides with narrowband impedance and energy of narrowband impedance is lower than wideband one, recurrence space shifting calculation can’t identify narrowband impedance’s area, which prompts normal spatial recurrence calculation come up short. An efficient approach for the removal of bipolar impulse noise using median filter [8], recurrence space calculation in view of likelihood insights which can take care of issue of wideband obstruction and narrowband impedance exist together, particularly when narrowband obstruction focus recurrence falls in wideband obstruction data transmission and power is lower than wideband one. Application of multi-frequency airborne electromagnetic to iron ore exploration are presented [9]. Introduced calculation can recognize area of narrowband impedance and set it to zero, then spatial shifting channel it.
Algorithm principle

Parts of GPS recipient which is helpless against impedance are bearer circle and code circle. It is required for advanced halfway recurrence flag to get ready synchronization. When versatile separating is connected to smother obstruction, IF or above IF is required in space area, recurrence space or space-recurrence channel. Fig 1 demonstrates GPS against sticking rule square outline.

**Fig. 1. GPS anti-Jamming principle**

Recurrence space score separating can smother single recurrence and narrowband impedance, while spatial sifting can both stifle narrowband and wideband obstruction. Within sight of different obstruction sources, versatile receiving wire exhibit ought to be utilized to stifle wideband impedance, and recurrence area indent shifting smother narrowband impedance, so recurrence space step channel ought to be put before spatial channel. Intruded on GPS flag ought to first channel narrowband derivation by recurrence area indent separating, while staying broadband obstruction shifted by spatial separating. These two calculations will be presented beneath separately.

**Frequency-domain Notch Filtering Algorithm**

Step 1, information I and Q flag is isolated into two preparing. Step 2, window treated I and Q flag. Including window capacity can be smoothly truncated by arranging limit which can lessen vitality an issue took after. Step 3, FFT changes windowed flag and yield windowed flag range. Step 4, flag range date was dealt with by likelihood measurements calculation and identifying narrowband obstruction in range. Step 5, looking at most extreme proportions in narrowband obstruction and wideband impedance to create edge esteem (figure 2). Step 6, ghastly line treat range information in view of produced limit esteem (figure 2). Step 7, IFFT changes information (fig 2). IFFT can change flag recurrence space handled to time area. Step 8, half postponed (fig 2). Time space flag defer half clock. Step 9, union deferred motion in step 8 and another flag (fig 2). Cover include handling can diminish flag misshape particle delivered by windowing, be that as it may, cost is multiplying computation sum. Typical way flag and postponed way flag are both to be windowed, FFT, recurrence area handled and IFFT, and finally, two arrangements are summed. As this reason, the equipment assets should be multiplied when planning equipment framework. Along these lines, decreasing sign bending with cover include technique will pay the cost of expanding framework’s multifaceted nature.
SpatialFilteringAlgorithmBasedOnPowerInversion(PI)

Spatial shifting method uses diverse heading of flag and impedance to accomplish obstruction concealment. Idea of versatile receiving wire was advanced by Van Atta in 1959. It is a summed up receiving wire, which can control every radio wire exhibit component’s weight parameters as indicated by real condition of flag and impedance and modify state of reception apparatus design naturally, in order to pick up best gathering of coveted flag in space and viably stifle surmising \[^5\]. Versatile receiving wire is a control framework, which is principally made out of reception apparatus cluster and ongoing versatile flag processor. Control reversal calculation is built up in light of direct obliged least change basis, which makes base yield energy of versatile cluster as advancement foundation \[^6\]. LCMV foundation is to guarantee pickup of coveted flag’s course which has been consistent as requirement condition, which makes aggregate yield control least, however not to zero, to guarantee yield SNR greatest. Fig3 underneath demonstrate fundamental structure of versatile receiving wire in view of PI calculation \[^7\].
Power inversion adaptive algorithm is one that has a strict constraint condition, which is that: \(W_T s_0 = 1\). It’s required to gain array antenna element 0 in adaptive array be 1 at any time. Let \(s_0 = [1, 0, \ldots, 0]^T\), \(W = [\omega_1, \omega_2, \ldots, \omega_N]\), and the condition \(W_T s_0 = 1\) will be converted to \(\omega_1 = 1\). Output power \(P_{out}\) of the antenna array can be expressed as:

\[
P_{out} = E \left\{ |Y(k)|^2 \right\} = E \left\{ [W^T X(k)] W^T X \right\} = W'' R_x W \tag{1}
\]

With Lagrange multipliers, we can obtain that:

\[
L(w) = W'' R_x W + \lambda (W^T s_0 - 1) \tag{2}
\]

Best weight vector is obtained that:

\[
W_{opt} = \alpha R_x^{-1} s_0 \tag{3}
\]

Undetermined coefficient obtained by constraints is:

\[
\alpha = 1/(s_0'' R_x^{-1} s_0) \tag{4}
\]

Recursive formula of the power inversion adaptive algorithm can be obtained through weighted recursive formula of LMS and largest constraint direction:

\[
\begin{align*}
\alpha(n+1) &= \alpha(n) - 2\mu \left[ I - (s_0 s_0^T)/(s_0^T s_0) \right] x^T(n) x(n) \alpha(n) \\
\alpha(0) &= [1, 0, \ldots, 0]^T \\
s_0 &= [1, 0, \ldots, 0]^T 
\end{align*} \tag{5}
\]

**Probability statistics algorithm**

Greatest esteem shows up in each edge and after that setting single-recurrence obstruction of primary thought of likelihood measurements calculation which has been in sparing areas. After a foreordained number measurement, most elevated number recorded and number is more noteworthy than edge esteem \(\gamma\), indicated as single-recurrence impedance for preparing. So as to ongoing preparing and decreasing utilization of registers, checking the position of greatest esteem showed up in present edge and past casing is same or not after FFT changing each time. On off chance area is same, statics time \(n\) in addition to 1; while area is distinctive, statics time \(n\) less 1. Now, setting a maximum breaking point esteem \(N_{max}\) and a lower restrict esteem \(N_{min}\). On off chance statics time \(n\) is surpasses as far as possible esteem or beneath as far as possible esteem, \(n\) stay unaltered. At that point, sets two edges esteem \(\alpha\) and \(\beta\). In event of \(N_{max}\) is more noteworthy than upper edge \(\alpha\) (\(\beta < \alpha < N_{max}\) implies there is a solitary recurrence impedance and setting to zero. In event that \(N_{min}\) is lower than \(\beta\) (\(\alpha > \beta > N_{min}\) implies there is no single-recurrence obstructions and proceeded with IFFT changed. Where \(\gamma = \alpha - \beta\)

It’s valuable to utilize likelihood insights recurrence area separating calculation to check irregular flag. Since narrowband obstruction might be submerged in broadband impedance a timeframe so it is elusive narrowband impedance tops in a few casings after FFT changing. In above manner narrowband impedance can’t be successfully shifted through. When utilizing likelihood measurements calculation, narrowband impedance can be effortlessly identified and can be adequately shifted through. In view of genuine necessities, constant statics calculation is required. Taking everything into account, likelihood insights calculation can viably shift through wideband impedance in narrowband obstruction, and furthermore prepare constant.

**RESULTS AND DISCUSSION**
Fig.4. Data after Probability statistics and filtering algorithm

Concealment of recurrence regulation interferes in GPS utilizing wire clusters and subspace projection strategies inspected thereupon. It is demonstrated, both spatial and transient marks of signs impinging on multi-sensor recipient accept comparative parts in collector execution. Spatial and transient marks' separate connection coefficients show up as square multiplicative items in SINR articulation. Because of Gold code structure and length of PN, distinctions in transient attributes of jammer and C/A code yield unimportant fleeting relationship coefficients. These little esteems enable collector to perform near the no-sticking case, independent of satellites and jammers' edges of landing. Exhibiting essential offering in basic obstruction concealment issue is through its pick up, which is dictated by quantity of reception apparatuses utilized at collector.

Contrasts between DS/SS flag and obstruction marks both in time recurrence and spatial areas furnish projection methods with capacity to evacuate impedance with a base bending of coveted flag. Recipient execution in light of subspace projections was broke down. It was demonstrated by lower execution bound is gotten when sources have same rakish position. For this situation, issue ends up noticeably proportional to a solitary radio wire beneficiary with just nearness of the exhibit pick up. Upper bound on execution is come to in obstruction free condition and furthermore compares to the case in which spatial mark of impedance is orthogonal to DS/SS flag.

CONCLUSION

Here it displays a spatial-recurrence hostile to sticking calculation helped with likelihood measurements. New calculation takes care of issue execution of spatial recurrence calculation which will diminish or fizzleled when narrowband obstruction focus recurrence falls in wideband impedance. After FFT changed, likelihood measurements calculation distinguishes whether narrowband obstruction exit or not and set it to zero when recognized. Calculation enhances security of spatial-recurrence hostile to sticking calculation and grows its extent of utilization.

Ethical Clearance- Taken from AMET University
Source of Funding– Self
Conflict of Interest – Nil
Modified

REFERENCES
Micromachined Flow Impactor for Spectrometer

K Thanigai Arul
Assistant Professor, Department of Physics, AMET University, Chennai

ABSTRACT

Here MEMS-based molecule estimate spectrometer utilizing a micro machined course impactor has been reported. A MEMS-based molecule counter displayed in research was created for measuring the aggregate number grouping of particles inside certain size range; proposed molecule estimate spectrometer is produced for measuring airborne molecule measure dispersion. Compressed air was used as a carrier gas, after oil droplets, moisture, and contamination particles were removed by a clean air supply system. Polystyrene latex (PSL) particles ranging from 100 to 2000 nm were used as test particles and were generated from an atomizer. PSL particles were supplied to proposed particle spectrometer. MEMS gadget for measuring streamlined molecule estimate dispersion is a first endeavor to best. General execution of MEMS-based molecule estimate spectrometer was assessed by contrasting size appropriation estimations and business instrument. Overall performance of MEMS-based particle spectrometer was evaluated by comparing size distribution measurements with APS. Proposed molecule estimate spectrometer shows effective estimation of molecule size circulation.

Keywords - MEMS, Spectrometer, dispersion, impactor.

INTRODUCTION

Estimation of molecule measure appropriation is an imperative device for innovative work in numerous enterprises including pharmaceutical, car, and so on. Industrially accessible molecule estimate analyzers are extensive and costly \cite{1-2}. Nowadays, a few reviews are accounted for the minimal, compact, and economical molecule identification instruments. Among these reviews, a MEMS-based molecule counter was exhibited in our past research in Converter Topology for Grid fed Operations. It is not appropriate for measuring molecule estimate circulation since it can just gauge aggregate number convergence of particles inside certain size range in curcuminaniline functionalized nano form. A minimal effort and reduced molecule estimate spectrometer utilizing a micro machined course impacted is proposed for measuring the molecule estimate dissemination. General execution of molecule estimate spectrometer was assessed by contrasting size conveyance estimations and business instrument. Main objective of the project is CFD analyzing new economizer duct. Analysis result is compared with existing design. Vanes are used to distribute gas equally from economizer. Effective heat transfer has been done by reducing tubes number in existing economizer. Economizer design is designed by using SOLIDWORKS software and analysis is made by ANSYS software \cite{5}.

SYSTEM DESIGN

Proposed MEMS-based particle size spectrometer is composed of a micro machined corona charger and a micro machined cascade impacted as shown in Figure 1. Working principle of particle size spectrometer is quite simple. If a high voltage is applied between a discharging electrode and a ground electrode, corona discharge occurs, and gaseous ions are generated. Particles are charged due to collision of particles with migrated ions. And then charged aerosol particles are introduced into micro machined cascade impacted. Modeling of Photovoltaic System Design \cite{3} with Converter Topology for Grid fed Operations are electrically charged aerosol containing working fluid which directs a nozzle towards flat particle collection plate and working fluid are deflected around edges of plate towards an outlet. Particles larger than certain threshold (cut-off diameter) have sufficient inertia to hurdle across working fluid streamlines and impinge on particle collection plate. Particles smaller than cut-off diameter (particle diameter corresponding to 50% collection efficiency) follow streamline more closely and remain suspended in working fluid.
Micro machined cascade impacted consists of four collection stage in a micro channel. Cut-off diameter of each stages are numerically calculated to be 500, 800, 1200, and 1700 nm. Low current sensing circuits are used to simultaneously measure charges carried by collected particles from each stage. Measured current signals are then converted to number concentration of particles. Molecule estimate circulation can be acquired by measuring number grouping of gathered particles from each stage. Figure 2 demonstrates a streamlined manufacture procedure of micro machined crown charger and course impacted. Manufacture of small scale crown charger started with designing silicon dioxide layer on a four inch silicon wafer. Sharp silicon tip was acknowledged by anisotropic wet scratching of silicon wafer utilizing a 20%wt potassium hydroxide and water fluid arrangement.

Micro machined cascade impact consists of particle
sensing electrodes patterned on a glass substrate and a poly dimethylsiloxane (PDMS) replica of micro fluidic channels. To form particle sensing electrodes, a 1 μm-thick titanium-copper electrode was deposited and patterned using a conventional photolithography method. To form a PDMS replica of the micro fluidic channels, SUEX sheets was patterned on a silicon wafer at a thickness of 500 μm for micro channel and particle collection palates. A mixture of PDMS pre-polymer and curing agent was poured onto patterned SUEX sheets and cured. Antimicrobial activity of green-synthesized manganese oxide nano particles and comparative studies with curcuminaniline functionalized nano form \cite{4} evaluation for nano particles. To define micro fluidic channel, both PDMS replica and particle sensing electrodes on a glass substrate were aligned and bonded after treatment with oxygen plasma.

**EXPERIMENTAL RESULTS**

Figure 3 shows a schematic diagram of experimental setup for evaluating overall performance of MEMS-based particle spectrometer. Compressed air was used as a carrier gas, after oil droplets, moisture, and contamination particles were removed by a clean air supply system. Polystyrene latex (PSL) particles ranging from 100 to 2000 nm were used as test particles and were generated from an atomizer. PSL particles were supplied to proposed particle spectrometer. Particles were charged by corona charger and then current by charged particles was measured by signal processing circuits \cite{5}. Overall performance of MEMS-based particle spectrometer was evaluated by comparing size distribution measurements with APS.
Figure 3 Schematic diagram of the experimental setup for evaluating performance of the MEMS-based particle spectrometer.

Figure 4 Comparison between the MEMS-based particle size spectrometer and the APS.

Figure 4 demonstrates deliberate molecule measure appropriations utilizing proposed molecule estimate spectrometer and APS. Great attention between two appropriations demonstrates MEMS-based molecule estimate spectrometer performs well and can be utilized for practical, ongoing molecule measure dissemination estimations.

CONCLUSION

MEMS-based vaporized molecule estimate spectrometer has been proposed for savvy and continuous molecule measure conveyance estimations. Molecule spectrometer is made out of a smaller scale crown charger and a course impacted. While a MEMS-based molecule counter introduced in past research was created for measuring aggregate number centralization of particles inside certain size range, proposed molecule estimate spectrometer is produced for measuring airborne molecule measure appropriation. Proposed molecule estimate spectrometer shows effective estimation of molecule size circulation.

Ethical Clearance- Taken from AMET University

Source of Funding- Self

Conflict of Interest- Nil

REFERENCES


Photovoltaic Module’s Physics: An Eight-Parameter Adaptive Model for the Single Diode Equivalent Circuit

Suresh Kumar
Assistant Professor, Department of Physics, AMET University, Chennai

ABSTRACT

Proposal for an eight-parameter versatile electrical model in view of physical conduct of the photovoltaic (PV) module as for varieties of ecological conditions has been enlightened here. A precise parameter estimation method proposed for new model in view of example inquiry streamlining calculation. Standard portrayal of I-V bends has five obscure parameters. Most of estimation systems recognize those five parameters for a particular irradiance and temperature. Distinctive arrangements of five parameters are found for each natural condition, i.e. evaluated parameters are constructed just in light of a scientific fitting with absence of physical significance which has been implied. In proposed eight-parameter versatile model, it is important to execute parameter estimation procedure once, in light of fact that model is legitimate for all scope of estimations of ecological conditions accessible on datasheets or test bends. Additionally limitation forced on every parameter makes model equipped for copying physical conduct of PV module, especially valuable in blame finding and prescient and remedial support of PV frameworks. Examination comes about in view of datasheet and exploratory bends are displayed to confirm viability of the proposed model and parameter estimation strategy.

Keywords: Adaptive estimation, PV cells, PV system, MPPT, EPAM

INTRODUCTION

Numerical models for photovoltaic (PV) cell/module are extremely significant important when a superior comprehension of its working when these models have been utilized for precisely foresee electrical power delivered from PV clusters, for reproductions of PV exhibits under various climate conditions and outline advancement of most extreme power point (MPP) following (MPPT) methods [1, 2].

Assurance of parameters for single-diode model of PV cells by expository systems [3, 4] is intricate since their I-V connections are portrayed by an arrangement of nonlinear conditions by which parameters are equally coupled. Due to multifaceted nature, a few distinct systems to decide these parameters have been proposed. Few strategies depend on typical assessment of these conditions to decide unequivocal expressions which gives estimations of five parameters in Strategies in light of numerical arrangements or iterative calculation have been likewise introduced, where an arrangement of conditions has been determined for particular working focuses given in datasheets of business modules, for example, short out (SC), open-circuit (OC) and MPP working focuses. Different ways of dealing will decide model’s parameters which apply a bend fitting or improvement calculations. These systems require an I-V bend for each PV module, which might be trial or given by makers’ datasheets.

Significant disadvantage of these systems assures model parameters which perform according to standard test conditions (STC). Subsequently, it requires how to utilize an extrapolating technique in light of PV module’s datasheet to decide the parameters for various natural conditions.
Subsequently, unique arrangements of parameters are got for each trial I-V bend. Since assessed parameters are constructing just in light of a numerical fit, there is no physical translation for variety in parameters. A few creators proposed conditions which relates to variety in parameters of PV demonstrate with changes in natural conditions, in any case, with next to zero physical legitimacy. Different Single-Diode PV Modelling Methods \(^\text{[5]}\) for finding efficient one, also find Symbolic algebra for calculation of series and parallel resistances in PV module model.

In a promising NLO crystal for optics photonics applications was proposed, an estimation procedure to recognize electrical model parameters giving some correspondence physical conduct of PV modules. Procedure could discover five obscure parameters of single diode display from information given by makers’ datasheet or exploratory bends. Technique depended on a full sweep of conceivable physical estimation of parameters at STC and considered reliance of Rs on temperature and irradiance \(^\text{[6]}\). Albeit fascinated a particular strategy which was restricted, since it didn’t considered other parameters’ reliance on temperature and irradiance, i.e. it couldn’t completely speak to physical wonders of PV modules.

**MATHEMATICAL MODEL FOR PHOTOVOLTAIC CELLS**

\[ I = I_g - I_{sat} \left[ e^{\left( \frac{V + IR_g}{V_t} \right)} - 1 \right] - \frac{V + IR_g}{R_p} \]  \hspace{1cm} (1)

\[ V_t = \frac{N_s A k T}{q} \]  \hspace{1cm} (2)

Equations of PV module (Figure 1) are given by:

\[ I_g = \left[ I_{g,STC} + \alpha (T - T_{ref}) \right] \frac{S}{S_{ref}} \]  \hspace{1cm} (3)

\[ I_{sat} = I_{sat,ref} \left( \frac{T}{T_{ref}} \right)^n \left[ \exp \left( \frac{qE_g N_s}{kA} \left( \frac{1}{T} - \frac{1}{T_{ref}} \right) \right) - 1 \right] \]  \hspace{1cm} (4)

where \( V \) and \( I \) are the yield voltage and current; \( V_t \) is the warm voltage, \( q \) is electron charge; \( k \) is the Boltzmann steady; \( T \) is temperature; \( N_s \) is quantity of arrangement associated cells; \( I_{sat} \) is invert immersion current; and \( A \) is diode idealist figure. For the most part, it is accepted that lone \( I_g \) and \( I_{sat} \) rely on upon natural conditions, by utilizing:

\[ R_s = R_{s,ref} \left[ 1 + k R_s (T - T_{ref}) \right] + R_{s,ref1} \]  \hspace{1cm} (9)

\[ R_p = R_{p,ref} \left[ 1 + k R_p (T - T_{ref}) \right] \left( \frac{S}{S_{ref}} \right)^{\gamma_{Rs}} \]  \hspace{1cm} (10)

\[ A = A_{ref} \]  \hspace{1cm} (11)

\[ I_g = I_{SC} \left( 1 + \frac{R_s}{R_p} \right) \]  \hspace{1cm} (12)

\[ I_{sat} = \frac{I_g - \frac{V_{oc}}{R_p}}{e^{\frac{V_{oc}}{V_t}} - 1} \]  \hspace{1cm} (13)

Where \( S \) is sunlight based illumination, e.g. is band gap vitality of sun oriented cell, is temperature coefficient of SC current. Subscript ref is estimation of the parameter at reference natural condition. Resistances and are resolved for a reference natural condition. For different conditions, for most part of qualities found at reference are rehashed or another estimation procedure is made. Be that as it may, to describe a PV module, it is critical to concentrate reliance on light and temperature of considerable number of parameters of the model.

**PROPOSED MODEL AND ESTIMATION TECHNIQUE**

Eight-Parameter Adaptive Model Based on reviews in past area, it is conceivable to define a scientific EPAM equipped for anticipating physical conduct of a PV module. Conditions portrays model are given by:

Equations are included in irradiance and temperature effects simultaneously into \( R_s \) and \( R_p \). Piazza and Vitale also considered two influences simultaneously, but are used purely with mathematical expressions without physical foundation. Therefore, proposed EPAM is first model to integrate extrapolation equations of parameters (as function of irradiance and temperature) into optimization algorithm in order to utilize multiple I-V curves as input data in parameter estimation process.
A non-linear optical crystal study for electrical and optical properties of the photovoltaic cell equation is obtained from in SC condition and represents another way of expressing $I_g$ dependence with $S$ and $T$. On other hand, it is obtained from OC condition and also represents another way of expressing $I_{sat}$ dependence with $T$. The flowchart for parameter estimation technique using PS algorithm is shown in Figure 2.

Figure 2: Flowchart of PS algorithm used in proposed parameter estimation technique for EPAM.

**COMPARISON RESULTS**

All algorithms presented are implemented by using MATLAB. In order to evaluate estimation accuracy of proposed technique, MAEP generated for best set of parameters obtained, in relation to a reference condition, is calculated and compared with the values found for
other techniques, already known in literature, for both types of curves (experimental and datasheets). For datasheet curves, a curve extractor algorithm developed in MATLAB through image processing, was used. For experimental curves, a curve extractor prototype was developed, including irradiance and temperature sensors together with accurate voltage and current probes to measure output voltage and current during charging capacitors. In addition, electrical model generated by each technique is simulated for other environmental conditions, in order to evaluate its performance by means of average value of MAEP.

In subsection, results of modules SP140PC (a mono crystalline PV module from Shell Solar) and ST40 (a Copper Indium Diselenide (CIS) based PV module from Shell Solar) are shown. Figure 3 shows comparison results, where all parameters were estimated at reference condition, defined as $S_{ref} = 1000 \text{ W/m}^2$ and $T_{ref} = 25\_\text{C}$ for both modules and $T_{ref} = 25\_\text{C}$ for both modules.

![Figure 3: Comparison between proposed estimated electrical model, datasheet curves for modules SP140PC ((a) and (b)) and ST40 ((c) and (d)) at different irradiances and temperatures are $R_s = -0.65$; $R_p = 0.05$;](image_url)

CONCLUSION

It has displayed an imaginative idea as far as photovoltaic demonstrating. Proposed display, EPAM, depends on physical conduct of PV module notwithstanding when minor departure from ecological conditions happen. Likewise, a precise parameter estimation procedure is proposed for this new model in light of example inquiry improvement calculation. New approach displayed prevalent outcomes when contrasted and surely understood procedures, demonstrating EPAM being viable in imitating physical conduct of modules, especially valuable in blame determination and prescient and remedial upkeep of PV frameworks corrective maintenance of PV systems.

- **Ethical Clearance** - Taken from AMET University.
- **Source of Funding** - Self
- **Conflict of Interest** - Nil

REFERENCES


Piezoelectric Microgenerator based Fabrication of Polymer Substrate with PPE, IDE and ME

K Rajesh
Assistant Professor, Department of Physics, AMET University, Chennai

ABSTRACT

Piezoelectric micro generator is an unimaginable technique which makes a self-controlled remote sensor hub. It is a procedure of changing over surrounding vitality into electrical vitality. Adaptable micro generator runs well with numerous normal bended, unpleasant and self-assertive surfaces, for example, human bodies, life forms, garments and structure surfaces. Zinc oxide and polymer have been utilized as piezoelectric material and substrate, separately, for biocompatible gadget. Symphonies investigation was completed utilizing Finite component strategy (FEM) apparatus to inspect impact of terminals on yield voltage. Micro generators will vary n\textsuperscript{th} cathodes which were manufactured and inspected for execution. Customary parallel plate metal cathodes (PPEs) are inclined to breaks and interior imperfections on twisting or extending, consequently a work anode (MEs) has been proposed. Copper MEs based micro generator has been shaped as per standard. Open-circuit electric capability of 2.8 VPEAK, 435 mVRMS for ME against electric capability of 2.3 VPEAK, 430 mVRMS and 0.9 V, 340 VPEAK, 40 mVRMS for inter digitalized terminals (IDEs) and PPE, individually, were recorded. Outline, creation, electrical characterisation and similar assessment of micro generator with three distinct terminals are exhibited.

**Keywords:** Piezoelectric, microgenerator, PPE, FEM, Polymer fabrication

INTRODUCTION

Use of wireless sensors, body implanted devices for medical diagnosis and wearable have been developed rapidly due to extensive growth of Internet of things \[1\]. Use of batteries is a major bottleneck battery here has driven system which motivates us to think of an alternative. Success of any system mainly depends on performance of sensors, but battery being major limiting factor which shortens lifetime of sensor node \[2, 3\]. Piezoelectric-based micro generator extracts energy from ambient sources and assists to extend life-span of sensor node. Studies on Hall Effect and DC conductivity measurements of semiconductor thin films prepared by chemical bath deposition (CBD) method based Zinc oxide (ZnO) piezoelectric material \[4\] described ease of material deposition, poling free, biocompatibility and environment friendly feature.

fabrication, characterisation, comparative evaluation of low-frequency micro generator using inter digitalized electrodes (IDEs), parallel plate metal electrodes (PPEs) and copper (Cu) mesh electrodes (MEs) are presented herewith \[5\]. Traditional electrodes have tendency to crack on bending and stretching of substrate, but mesh structure is immune system to such problem in Al-doped PbS nano particles hybrid composite for optical and electrical response is explained here where a chemical synthesized Al-doped PbS nano particles hybrid composite for optical and electrical response\[6\]. Main focus is to harvest energy from human body vibrations lying in range of 1–100 Hz frequency \[7\].

Fig 1 Architecture of self-powered sensor node
Autonomous sensor node architecture is depicted in schematic Fig 1. Sensor is used to sense physiological/physical parameters for health monitoring such as pulse rate, body temperature, body movement, heart rate etc.

**DESIGN AND ANALYSIS**

Vibration-based micro generator has been suitable for power generation method because of availability in almost all cases. A highly effective and efficient way to harvest vibration energy is piezoelectric energy transformation. Cantilever-based micro generator is 30-mm-long, 10-mm-wide and 0.1-mm-thick substrate with 10-µm-thick layer of ZnO active material. When it’s accelerated due to vibrating source(s), stress has been exerted to a material which creates deformation or expansion in the material. This causes charge separation and accumulation of charges along electrodes. Micro generator with all three electrodes scheme was designed as shown in Fig 2.

![Fig 2(a) PPE-based micro generator; Fig 2(b) IDE-based micro generator; Fig 2(c) MEs based micro generator](image)

**SIMULATION RESULTS**

Performance of devices with three types of electrodes scheme has been evaluated through simulations. Comparative analysis is depicted in Fig 3 followed by discussion.

![Fig 3: Simulation results for electric potential with respect to frequency for micro generator with MEs, PPE and IDE](image)
Here it has been carried different studies for comparative evaluation such as electric potential, Z-displacement, von Mises stress and electric field distribution. Comparison of all three devices is carried out on basis of harvested electric potential. Von Mises stress analysis is widely used to ensure reliable operation of cantilever. If maximum value of von Mises stress exceeds yield stress, then device breaks down. For present devices, it has been carried out here wherein analysis for all three devices has been obtained with maximum value in range of 6.5–8.5 MPa against yield stress value of 55 MPa. Here it shows how much devices would be reliable.

Micro generator with IDE (Device I): Simulation result reveals 1.9 VPEAK electric potential, 538 µm total displacements at peak resonance frequency of 61 Hz were observed.

Micro generator with PPE (Device II): Electric potential of 0.56 V, total displacement of 393 µm were observed at resonance frequency 48 Hz. Micro generator with ME (Device III): Electric potential with maximum value of 3 V, maximum displacement 440 µm at resonance frequency 44 Hz were recorded.

**Fabrication of micro generator:** fabrication steps of cantilever-based micro generator differ for IDE and PPE/ME. Many researchers fabricated such devices using clean room facility, costly silicon wafer and chemicals. Proposed method has been to simplify on operation and low cost. Substrates are cleaned with detergent, deionised (DI) water and acetone for 15 min and heated for 15 min at 100°C [3]. Major fabrication steps are depicted in Fig. 4 and elaborated below.

**Fabrication process for micro generator with IDE**

- Mixed silicone elastomeric and curing agent in ratio of 10:1.
- IDE adhered to substrate using polydimethylsiloxane (PDMS) (Sylgard 184, Dow Corning).
- ZnO (Merck 99.9% purity) has been deposited using spinner at chunk speed of 400 rpm for 20 s and 1500 rpm for 40s.
- Heated in oven (Bio-Techniques™ India) at 150°C for 10 min to evaporate solvent and impurities.
- Deposition to heating process was repeated 8–10 times to achieve desired thickness of active material.
Device crystallisation at 150°C for 8–9 h duration followed by packaging.

Fabrication process for micro generator with PPE and MEs

Upper electrode aligned over ZnO and packed with PDMS

The characterisation setup includes soundcard oscilloscope, vibration excited along with SCS. Maximum electric potential (open circuit) of 2.8 VPEAK, 435 mVRMS at resonance frequency 40 Hz for ME were recorded. The reason for achieving higher electric potential is mainly because of low mechanical damping by MEs. Comparative evaluation is carried out on the basis facts and merit (FOM) tabulated in Table 2. It is ratio of electric potential and device volume × acceleration. Acceleration was approximately set to 1 g for all experiments. Micro generator with ME has excelled with FOM value of 0.93 in this race.

CONCLUSION

Novel micro generator with ZnO piezoelectric material with Cu MEs has remarkable reliability, flexibility and FOM of 0.93. Here concept was validated by finite element method (FEM) simulation and characterisation results. It has been observed between analytical, simulated and fabricated results there has been a good match. Maximum electric potential of 2.8 VPEAK, 435 mVRMS at resonance frequency of 40 Hz for ME-based micro generator has been observed here. In brief, characterisation results reveal that 311% and 121% rise in electrical potential as compared with PPE and IDE, respectively, were found.

REFERENCES


Ethical Clearance- Taken from AMET University

Source of Funding - Self

Conflict of Interest - Nil
Call for Papers / Article Submission

The editor invites scholarly articles that contribute to the development and understanding of all aspects of Public Health and all medical specialities. All manuscripts are double blind peer reviewed. If there is a requirement, medical statistician review statistical content. Invitation to submit paper: A general invitation is extended to authors to submit papers papers for publication in IJPHRD.

The following guidelines should be noted:
- The article must be submitted by e-mail only. Hard copy not needed. Send article as attachment in e-mail.
- The article should be accompanied by a declaration from all authors that it is an original work and has not been sent to any other journal for publication.
- As a policy matter, journal encourages articles regarding new concepts and new information.
- Article should have a Title
- Names of authors
- Your Affiliation (designations with college address)
- Abstract
- Key words
- Introduction or back ground
- Material and Methods
- Findings
- Conclusion
- Acknowledgements
- Interest of conflict
- References in Vancouver style.
- Please quote references in text by superscripting
- Word limit 2500-3000 words, MSWORD Format, single file

All articles should be sent to: editor.ijphrd@gmail.com
CALL FOR SUBSCRIPTIONS

About the Journal

Print-ISSN: 0976-0245  Electronic - ISSN: 0976-5506, Frequency:  Monthly

Indian Journal of Public Health Research & Development is a double blind peer reviewed international Journal. The frequency is half yearly. It deals with all aspects of Public Health including Community Medicine, Public Health Epidemiology, Occupational Health, Environmental Hazards, Clinical Research, Public Health Laws and covers all medical specialities concerned with research and development for the masses. The journal strongly encourages reports of research carried out within Indian continent and south east Asia.

The journal has been assigned international standards (ISSN) serial number and is indexed with Index Copernicus (Poland). It is also brought to notice that the journal is being covered by many international databases.

Subscription Information

<table>
<thead>
<tr>
<th>Journal Title</th>
<th>Pricing of Journals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Only</td>
<td>Print Only</td>
</tr>
<tr>
<td>INR 7000</td>
<td>INR 9000</td>
</tr>
<tr>
<td>INR 5500</td>
<td></td>
</tr>
<tr>
<td>Online Only</td>
<td>USD 450</td>
</tr>
<tr>
<td>USD 550</td>
<td>USD 350</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.

Send all payment to:

Institute of Medico-Legal Publications
501, Manisha Building, 75-76, Nehru Place, New Delhi-110019,
Mob: 09971888542, E-mail: editor.ijphrd@gmail.com,
Website: www.ijphrd.com